

Service Methods

Motor Repair Service and Its Problems

By George Tatem
President, Electric Refrigeration Motor Co., Inc.

MOTOR repair service is today one of the most important factors in refrigeration and oil burner service. Every time a new refrigerator or a new oil burner is sold, it is a potential customer for the motor repair shop. So the motor repair industry plays one of the most important parts in the refrigeration and oil burner field.

The fractional horsepower motor repair business has developed to the point where it has become necessary for companies to establish specialists in its handling.

Up to within a year or two ago it was generally stated and accepted that any company attempting to specialize in fractional horsepower motors could not succeed without having additional lines to carry it along. Today, however, in order to give satisfactory service on fractional horsepower motors of all different makes, speeds, cycles and kinds, it is best that a department be set up to handle this particular type of work alone.

There is no doubt that mechanics must be trained along the lines of fractional horsepower motors and fractional horsepower motors alone. They are so different to service and repair from the usual 2 and 3 phase motors. Their volume alone is tremendous.

The writer contends that the majority of motor repair shops set up to do fractional horsepower motors are not qualified to handle the large horsepower motors, and the reverse is equally true.

The equipment necessary in the handling of fractional horsepower motors is almost entirely foreign to that which is required for motors of larger horsepower. The time has arrived where it is necessary for refrigeration distributors, dealers, ice cream manufacturers and independent serv-

ice men, and oil burner distributors, dealers, etc., to recognize this situation.

It should be taken into consideration that the legitimate motor repair shop absorbs about 60% of all motors returned within the course of one year as being under guarantee, but which have failed due to outside causes such as faulty installations, overloads, moisture, or improper repairs.

The legitimate motor repair firm accepts the majority of these as being

Laying Stator Coils



Fig. 2—Stator coils being laid in laminations.

part of their business. There are without a doubt times when the distributors and dealers are forced to accept conditions such as these due to the fact that their customer looks to them for warranty repairs. This is one of the evils of the service business which cannot be readily overcome, and it must be accepted by the refrigeration agencies, the oil burner agencies, and the fractional horsepower motor repair shop as well.

The operation of an efficient fractional horsepower motor repair shop entails the employment of expensive and precise machinery; in order to give a general idea of some of the machines used, a few are illustrated. Motors with large or auxiliary oil wells have prolonged the life of the fractional horsepower motor. The same thing applies to the various motor protectors which are on the market today.

In the past, a large percentage of motors failed due to the lack of lubrication within six months after installation; with the new type large oil receptacle and the auxiliary oilers which are on the market today, the average life of the same bearing is extended to approximately two years.

A similar condition was encountered in motors being either completely or partially burnt; since the inception and use of motor overload protectors,

the number of motors failing and burning out due to overloads has decreased notably.

The writer often has been asked to what extent motor repairs can be safely made in the field, and without hesitation answers that no repairs should be attempted on any fractional horsepower motors in the field, because there are too many conditions which enter into the job.

There is no great feat in replacing brushes on repulsion induction type motors in the field if they are properly handled and properly sanded in on the commutator.

On the other hand, the question of replacing condensers on capacitor motors has come up numerous times. To replace the condenser on a capacitor motor in the field is a rather hazardous job due to the fact that a large number of condensers fail from other causes such as switches and start windings. Therefore under no conditions should anyone attempt to replace a condenser in the field without having first had the motor properly tested to determine whether or not there were other causes which made the condenser fail in the first place.

For a very nominal charge, any motor repair house specializing in fractional horsepower motors will test out any motors which may have been in stock for any length of time and have not been in use, or test doubtful motors.

With the low cost of servicing and repairing fractional horsepower motors on the present day basis, it is no longer logical for any company to attempt to do any extensive motor repair service in the field, and from the recent trend it is quite obvious that very few companies do attempt such repairs.

How a Fractional Horsepower Motor Can Be Rebuilt

A fractional horsepower motor can be entirely rebuilt at about 60% of the cost of a new motor. This applies to a motor that may be completely burnt out, including such major parts as a new commutator, new brush holder, new short circuiting device.

If there is a stator frame, two end bells and an armature, a frac-

Rewinding Armature



Fig. 3—Armature being rewound with double wire needle.

Reaming Bearings



Fig. 4—New bearings installed and being reamed out with a line reamer to assure perfect fit.

tional horsepower motor can be successfully rebuilt.

In order to give a clear and concise picture of the motor being rebuilt, we are going to take as an example a 1/4-hp. motor completely burnt out.

The motor is received in the shop entirely burnt out. It is first given to a master mechanic to determine the extent of the damage. It is entirely disassembled, all burnt and worn parts are discarded, the stator is sent to the stator winding department where it is entirely stripped of all wire, insulation, and paint. The laminations are thoroughly checked. New insulation is installed, new wire is installed, together with top sticks which hold the coils in place. Usually enameled coppered wire is used in winding stators; it is then dipped in insulating varnish and baked.

The armature is sent to the armature winding department, where it is entirely stripped, the old commutator removed, new insulation installed in the armature, new wire of the type that is needed is added together with new top sticks, and a new commutator is installed.

The armature is then painted with a special insulation varnish, after which it is placed in an electrically heated oven. The baking of an armature after it is rewound is just as essential as the winding of the armature itself, because the life of that motor will depend a great deal upon the type of baking varnish used, and of the length of time that the armature is permitted to bake.

Following completion of the necessary machine work on the commutator, the armature is then placed in a balancing machine and perfectly balanced. This is necessary and vital, for an armature improperly balanced will not permit satisfactory operation of the motor.

The end frames and all component parts are entirely cleansed with a safety solvent solution, and new bearings installed in the end frames. To have a satisfactorily repaired motor, it is necessary that line reamers be used in reaming out the inside surface of the bearings to eliminate any high spots in the bearings. (This is often the cause of high wattage

on motors after being reoperated.) End bells and bearings are then properly fitted to the armature shaft, and after the entire motor is reassembled, the motor is "run in" so that the armature shaft may be properly seated on the bearings.

When the motor is entirely assembled, but lacking what is commonly called the "finishing touches"—the installation of minor exterior parts,—it is given a rigid test. This includes a test to determine whether or not it may have developed a noise condition, testing of wattage and amperage, idling and full load, high voltage ground test, and torque test.

The motor is then returned to the master mechanic who puts the necessary finishing touches on the motor, rechecks all frame bolts and base screws, and returns it again to the test room for its final inspection before being sent to the spray room where the motor is completely refinished so as to give it the appearance of a new motor. The same guarantee that is extended by the original motor manufacturer is given universally on any motor repaired by a legitimate motor repair house.

In servicing and repairing motors, regardless of their condition, new leads should be installed, and if originally rubber mounted, new rubber bushings should be installed.

Perfection Introduces Water Valve Line

(Concluded from Page 1, Column 5)
valves. No special wrench is required to remove caps from Perfection regulators.

Claim is made by officials of the Perfection Parts Co. that these valves are non-chattering, tight closing, and full operating. Varying water pressure has no effect on these regulators because the design is such that the water inlet is under the seat. Water pressure, plus a small light stainless steel spring, forces the seat disc and piston up.

Valve stems are made of bronze, bellows sealed at valve, and no stuffing box is required.

Valve bodies are of special high pressure non-corrosive iron casting. Valve caps are made of non-corrosive bronze. Valve strainers are oversize capacity, and the non-corrosive bronze circular replaceable screw is easy to clean without removing valve.

Power bellows are heavy duty, high pressure construction of phosphor bronze, 300 lb. test. The main spring is of high-temper, rust-proofed steel wire.

Moving parts and bearing surfaces are all non-corrosive bronze. Seat discs are made of composition rubber, made for high temperature service. Valve seats are of bronze bushing type, and can be replaced quickly without removing valve from line.

BUNDY ANSWERS:

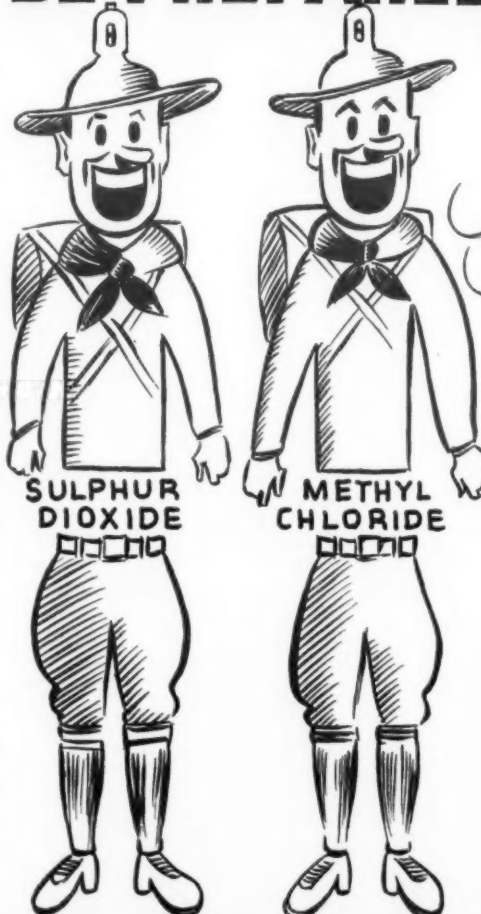
1. Accuracy in shooting
2. Des Moines, Iowa
3. 1/4", 1/2", 3/4", 1", 1 1/4", 1 1/2", 1 3/4", 2", 2 1/4", 2 1/2", 2 3/4", 3", 3 1/4", 3 1/2", 3 3/4", 4", 4 1/4", 4 1/2", 4 3/4", 5", 5 1/4", 5 1/2", 5 3/4", 6", 6 1/4", 6 1/2", 6 3/4", 7", 7 1/4", 7 1/2", 7 3/4", 8", 8 1/4", 8 1/2", 8 3/4", 9", 9 1/4", 9 1/2", 9 3/4", 10"
4. A sea-going mammal (sperm whale)
5. A source of fertilizer

BE PREPARED TO GIVE SERVICE

IS THE MOTTO OF THE

ANSUL TWINS

DISTRIBUTORS



SULPHUR
DIOXIDE

METHYL
CHLORIDE

DISTRIBUTORS
AND JOBBERS
IN ALL
IMPORTANT
CITIES

ANSUL CHEMICAL COMPANY

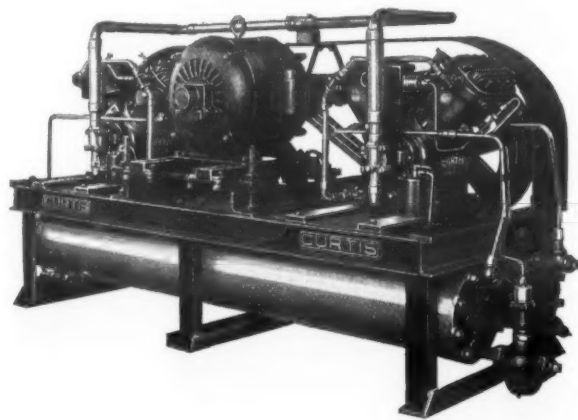
MARINETTE » » » » » WISCONSIN

AGE ISN'T ALL

... but Experience
is mighty important

BEHIND every Curtis condensing unit stands thirteen years of continuous development, 42 years of experience in making fine compressors, and an engineering and manufacturing background that dates back 82 years to 1854.

Age alone isn't enough, but Curtis' Experience means a great deal today. It means that Curtis condensing units and refrigerating equipment



are carefully and soundly designed—that Curtis standards are the highest in the industry.

Investigate the performance of Curtis products, and you'll see that experience counts a lot.

CURTIS

CURTIS REFRIGERATING MACHINE CO.
Division of Curtis Manufacturing Co.
1912 Kienlen Avenue - - - Saint Louis, Missouri

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Business News Pub. Co.THREE DOLLARS PER YEAR
TEN CENTS PER COPY**Servicemen Told
To Seek Better
Licensing Codes****Benefits Outweigh Costs
RSES Hears; Technical
Talks on Program**

MEMPHIS, Tenn. — Independent electric refrigeration service engineers from all sections of the country east of the Rockies assembled last week at the Gayoso hotel here to listen to talks on technical problems by leading refrigeration engineers, and to discuss plans for furthering their interest by cooperative action, in the program of the third annual convention of the Refrigeration Service Engineers Society.

Registration at the convention totaled approximately 500 persons, of which number about three-quarters were service men, and the remainder parts jobbers and parts manufacturers. This was a considerable increase (Concluded on Page 2, Column 5)

**Convention Pictures and
Reports Next Week**

To do full justice to the conventions of Refrigeration Service Engineers Society, Refrigeration Supply Jobbers Association, and Refrigeration Supplies and Parts Manufacturers Association, held last week in Memphis, Tenn., the editors of the News have decided to split their coverage of the three meetings between this and the next (Nov. 25) issues.

Next week's News will contain complete reports of all technical papers read at Refrigeration Service Engineers Society sessions. Pictures and descriptions of exhibits at the convention will also be published. The Nov. 25 issue will also carry pictures of parts manufacturers and jobbers, taken during the meeting.

**J. M. Fernald Elected
President of RMA**

WASHINGTON, D. C.—J. M. Fernald, general manager of Baker Ice Machine Co., Inc., Omaha, was elected president of the Refrigerating Machinery Association at its annual meeting here Friday, Nov. 13.

A veteran executive in the refrigerating machinery and air-conditioning industries, Mr. Fernald, following service in the Army during the war, was first sales engineer and later New England district manager for the Cutler-Hammer organization.

In 1926 he became associated with the Electric Refrigeration Corp. (later Kelvinator) as director of commercial sales. Within two years he was appointed head of Kelvinator's commercial refrigeration division, which position he left to become general manager of Baker Ice Machine Co.

**Reports by Kansas City Distributors Show
5-and 6-Cu. Ft. Models Far in Lead**

KANSAS CITY, Mo.—Reports from five large Kansas City distributors and one mail-order company indicate that of the 9,184 electric refrigerators sold by them during the first nine months of 1936, 7,430, or more than 80%, were for sizes between 5 and 8 cu. ft.

The 9,184 units represent 58% of the 15,920 sold by dealers in the Greater Kansas City area during the first nine months of the year, according to figures compiled by G. W. Weston, secretary-manager of the Electric and Radio Association of Kansas City.

This year's three-quarter total represents a slight decline from 1935 figures for the same period, in which 16,497 units were sold. It is also a drop of approximately 20% from the 1934 total for the nine months, 20,021 units. August sales this year were 495 units, compared with 402 last year and 633 in 1934.

According to the classification of

**New Guarantees
Announced by
Valve Makers**

DETROIT—Revised guarantee and replacement plans, covering their automatic and thermostatic expansion valves, have been made effective this month by two valve manufacturers, Detroit Lubricator Co. and American Injector Co.

Details of the guarantee policies are similar. Valves are guaranteed for one year of field operation against defects in material and workmanship. The "warranty" period covers 18 months, the additional six months allowing for floating time in the factory and on jobbers' shelves.

Valves returned inoperative within (Concluded on Page 2, Column 4)

**Electrical Leagues
To Meet Nov. 20-21**

CLEVELAND—Both local and national phases of two major problems in the electrical industry—kitchen modernization and the merchandising of household appliances—will be discussed by prominent public utility company executives at the first annual International Association of Electrical Leagues meeting here on Friday and Saturday of this week.

Friday's sessions, which will be open to the public, will cover modernizing and merchandising topics.

George E. Whitwell of Philadelphia Electric Co., J. J. Cadigan, Boston, George R. Conover, Philadelphia, and J. S. Bartlett, Washington, D. C., will discuss the modernizing program. Electrical housewares merchandising will be covered by H. P. J. Steinmetz of Public Service Electric & Gas Co., S. S. Vineberg, Buffalo, J. E. North, Cleveland, and E. P. Zachman, Cincinnati.

**Dry-Zero Shipments Up
41% for 9 Months**

CHICAGO—During the first nine months of 1936, Dry-Zero Corp. shipped 591,010 sets of household refrigerator insulation, a 41% increase over shipments for the same period last year, according to Harvey Lindsay, Dry-Zero president.

Railroad refrigerator car insulation shipments for the same period were over 10,000,000 board feet. Sales of refrigerated motor truck insulation totaled 2,219,852 board feet, or 37% ahead of 1935, Mr. Lindsay stated.

**Manross Heads Universal
Cooler Sales for Canada**

BRANTFORD, Ontario, Canada—Park A. Manross has been appointed sales and advertising manager of Universal Cooler Co. of Canada, Ltd., it was announced last week by D. Robertson, general manager of the Canadian Universal Cooler organization.

Mr. Manross is a pioneer in electric refrigeration activities in Canada, having served seven-and-a-half years with Kelvinator of Canada, Ltd.

**Court Restrains
Universal Cooler
Stock Transfer****Stockholders Sue to Annul
Kelvinator Option; Bill
Answered by Company**

DETROIT—Universal Cooler Corp. and its directors and officers have been restrained by the Wayne County Circuit Court from permitting the exercise of options granted by directors to J. E. Ford, Jr., a company director, to purchase majority control, the principal portion of which options were assigned by Mr. Ford to Kelvinator Corp.

The restraining order was issued following the filing of a suppressed bill of complaint by three stockholders, representing stockholders holding more than 10% of the outstanding stock in the corporation.

Validity of the options is contested on the allegation of the plaintiffs that they were not informed before the options were granted, that they were not made fully acquainted with the details surrounding the granting of the options, that they had not approved the options, and that they were not granted in complete compliance with legal requirements. The plaintiffs therefore ask that the action of the company, directors, and officers in granting the options be rescinded by court order.

It is alleged by the plaintiffs in their action that a loan amounting to (Concluded on Page 20, Column 1)

**CRMA Calls Plan on
Terms a Success and
Starts Trade-in Study**

CHICAGO—With members reporting increased sales, and a definite checking of the "easy terms evil" which has been a disturbing factor since the sales swing started upwards in 1934, members of the Commercial Refrigerator Manufacturers Association met here a fortnight ago to discuss policies for the coming year.

Although a few contracts are still being taken with deficient down payments or a longer credit period than the recommended maximum of 24 months, it was reported by those attending the meeting that the bulk of instalment sales closed currently conform to the policies subscribed to by a majority of the firms in the industry early the past summer. (Story in July 1 issue, REFRIGERATION NEWS.)

In recognition of this "return to sanity" on financing, it was reported that a leading finance company re- (Concluded on Page 2, Column 1)

**Trailer Refrigerator Exhibited at Detroit
Auto Show; Uses New System**

By James R. McCallum

DETROIT—"Aerflo" cooling systems, small, compact electric refrigerating units designed primarily for use in automobile travel trailers, will be produced here starting Nov. 20, according to Fred J. Heideman, designer and developer of the unit, and head of the Aerflo company.

This new trailer refrigerator was shown at the recent New York auto show, and is arousing a great deal of interest at the current Detroit auto show, where it is displayed in conjunction with the Palace Travel Coach exhibit.

In the Aerflo system of refrigeration, a methyl chloride compressor operating with a twin-coil system freezes pure water in a heavily tinned copper cooling unit measuring 3 by 10 by 12 inches. Mr. Heideman describes the method of freezing as "shingle freezing."

"The freezing process is completely controlled," he explains, "the water in the container being frozen from the bottom up, thus eliminating all lateral pressure within the container, and causing all expansion to take place at the top."

The refrigeration unit is of the "holdover" type, refrigeration stored in the frozen water in the cooling

**Jobbers Set Up New Qualifications,
Plan Increased Cooperative Activity;
Parts Makers Air Trade Policy Views****Discounts to National
Users, Guarantees &
Catalogs Discussed**

MEMPHIS, Tenn.—Working towards a coordination of policy on such important trade matters as discounts, terms of sales f.o.b., returned goods, resale prices, quantity discounts, contractual arrangements, and catalog policy, through exchange of information on individual company policy, members of the Refrigeration Supplies and Parts Manufacturers' Association met last Tuesday at the Peabody hotel here for the second annual convention of the association.

Group classification meetings were held Tuesday afternoon, at which time representatives in such product groups as expansion valves, copper tubing, valves and fittings, refrigerants, controls, finned surface, belts, compressor and compressor parts, met for an exchange of information on individual trade policies on these items.

The committee chairman in each group classification will draw up a report describing the practices most generally followed on the matters enumerated in the first paragraph. These reports will be submitted to Executive Secretary Frank J. Gleason of the association, and will be published in bulletin form, and probably also in AIR CONDITIONING AND REFRIGERATION NEWS.

At their convention the parts manufacturers agreed to the qualifications of a jobber of refrigeration parts as established by the Jobbers Association (see story in this issue).

Policy on discounts and sales channels to national accounts, such as ice cream manufacturing concerns, was discussed at length during the convention sessions, with no definite conclusion being reached.

The manufacturers, however, did reach more or less of a general agreement on the matter of product guarantees. A standard 12-months guarantee with an overlap period for "floating" stock was most generally favored, although there perhaps may be some modifications in the various group classifications.

The parts manufacturers definitely decided that they would assume no contingent liability in connection with the use of their products.

On the matter of catalogs it was the consensus of those present that a standard 8½ by 11-inch sheet be adopted by all manufacturers, with a recommended date of issuance sometime between Jan. 1 and March 1.

Some of the group meetings were continued over into Wednesday, at (Concluded on Page 5, Column 1)

**Parts Wholesalers Seek
Cooperation on Proper
Margins, Resale Prices**

By Phil B. Redeker

MEMPHIS, Tenn.—Setting up new qualifications for membership, making plans for a concerted drive to bring all eligible non-members into the association, and coordinating individual viewpoints on pricing and other trade practices, representatives of nearly 60 refrigeration supply and parts jobbers met Wednesday, Nov. 11, at the Peabody hotel here in the second annual convention of the Refrigeration Supply Jobbers Association.

Two-thirds of the association's membership was represented at the convention. A number of non-member jobbers were also on hand.

In further clarifying its qualifications of what constitutes a parts jobber, the association made definite its pronouncement that a parts jobber (insofar as his activity in the refrigeration field is concerned) must confine his activities to the wholesaling of refrigeration parts and supplies.

The new requirement of eligibility for membership in the association makes it mandatory that the jobber stock at least 75% of the following classes of equipment:

1. Copper tubing, hard and soft.
2. Refrigeration valves and fittings.
3. Accessories.
4. Refrigerants and lubricants.
5. Belts and pulleys.
6. Expansion valves.
7. Controls.
8. Gaskets.
9. Tools.
10. Gauges and thermometers.
11. Filters and dehydrators.
12. Evaporators and condensers.

These classifications were drawn up and defined during the convention by a committee consisting of: Henry Merkel, Merkel Brothers Co., Cincinnati; F. S. Langsenkamp, Jr., F. H. Langsenkamp Co., Indianapolis; O. A. Forslund, Forslund Pump & Machinery Co., Kansas City; H. L. Milne, Modern Household Appliances, Ltd., Montreal, Canada; and H. E. Adams, Lewis Supply Co., Memphis.

The association will seek the cooperation of parts manufacturers in the observance of the qualifications necessary for what the association believes is a "true jobber" of refrigeration parts.

Much of the day's session was devoted to open discussions and exchange of ideas on pricing and other sales policies. In one of their official acts the jobbers requested the manufacturers to provide price structures that offer jobbers margins sufficiently great to allow an operating profit on all items. It was emphasized that this stipulation on margins should cover replacement, as well as new items. Some jobbers seemed to feel that on replacement items they had been assuming the status of a "trading post."

The subject of cash discounts was discussed and it was the consensus of those present that cash discounts offered by jobbers should conform to the basis of cash discounts used by the manufacturers, and in no case should exceed 2%.

Maintenance of established retail prices was a major point in the discussion among jobbers. It was felt that the Robinson-Patman Act, since it allowed manufacturers to "choose" their customers and to make contractual provisions concerning resale prices, might serve to strengthen the jobbers' stand on this point. Others, however, pointed out that most jobbers do an intrastate business, to which the Robinson-Patman Act doesn't apply.

Sentiment was expressed at the meeting that the manufacturers should give jobbers all assistance possible, in return for which the jobber should more actively merchandise the lines he carries in stock.

The committee in charge of cooperative advertising for the association submitted a plan whereby a certain portion of the increased dues will be allotted to the advertising fund, and this will be used in trade-paper advertising to educate non-member jobbers, service engineers, (Concluded on Page 5, Column 2)

Study of 10-Year Resale Figures to Help Case Manufacturers Set Trade-In Values

(Concluded from Page 1, Column 3)
cently announced a new plan for financing commercial refrigerator paper which stipulates a minimum cash down payment of 20% and maximum terms of 24 months. Other finance companies were declared to have been contemplating similar action.

Dealers and local sales representatives are getting behind this policy, according to reports received at the meeting. A "Commercial Refrigeration League," composed of salesmen and dealers operating in the Richmond, Va., territory, has been formed, with headquarters at 1302 E. Main St., Richmond. Robert M. Dunville is secretary of this local group, with which the national organization is cooperating closely.

One problem considered at some length at the meeting was that of

trade-ins. As the result of discussion at the sessions, it was decided to have the association make a study of resale values applying to products marketed during the past 10 years.

The resulting figures, it is felt, will serve as an index to the actual market for used refrigerators in contrast to their "trading value."

Members present at the recent meeting paid tribute to the progress made by the association in clearing up many trade evils.

At the close of the meeting, J. I. Holcomb, president of Holcomb & Hoke Mfg. Co., Indianapolis, was unanimously elected president to fill the unexpired term of the late W. T. Sherer of Sherer-Gillett Co. Herman C. Schmidt, head of the Cincinnati Butchers Supply Co., Cincinnati, was made a member of the executive committee.

A. F. Head President of G-E's Refrigerania

CLEVELAND—A. F. Head, of General Electric Supply Corp., local General Electric Co. appliance distributor, was elected president of "Refrigerania" in the sales campaign just concluded by the specialty appliance division of G-E's appliance and merchandise department.

"Refrigerania" is a mythical country created by G-E as a basis for annual sales campaigns. Officials of this country are elected each year, the election being based on number of sales made in each distributionship.

Other officers elected were: A. Wayne Merriam, Schenectady, vice president; Ed Schaefer, Milwaukee, secretary of state; Walter Hess, Indianapolis, secretary of the treasury.

At the conclusion of the campaign, 141% of the national quota had been realized, according to Jean DeJen, sales campaign manager.

New Guarantees on Valves Announced

(Concluded from Page 1, Column 2)
18 months from the date of manufacture will be repaired or replaced without charge, if defective in material or workmanship; if not, they will be repaired or replaced at a flat price.

After the guarantee period has passed, valves will be accepted up to three years to be repaired or replaced at the flat rate; valves more than three years old will not be accepted.

Replacement valves will be marked with an "R," stamped on the valve body, and will not be guaranteed for any definite time; however, replacement valves not more than three years old will be handled under the same plan as that applying to new equipment.

DETROIT LUBRICATOR CO.

Details of the Detroit Lubricator plan, as announced by I. J. Knudson, manager of the refrigeration division, are as follows:

1. Valves are guaranteed for one year of field operation against defects in workmanship and material.

2. As before, each valve will be marked to indicate the quarter of the year in which it was made—the letters A, B, C, D, being used to indicate the first, second, third, or fourth quarter, which will be followed by two figures to show the year. Thus A36 indicate the first quarter of 1936, B36 the second, etc.

3. Also, as before, the "guaranty" or "warranty" period is 18 months. This insures a full year of field service guarantee by allowing six months for floating stock on your or our shelves.

4. Valves returned inoperative within 18 months from the date of manufacture.

a. If on inspection at the factory, defects in material or workmanship prove to be the cause of inoperation, the valves will be repaired or replaced without charge except for incoming transportation charges, if any.

b. If the valves are inoperative due to causes beyond our control, they will be repaired or replaced at the flat prices, plus incoming transportation charges, if any.

5. Valves returned inoperative after 18 months from the date of manufacture.

a. If less than three years old, such valves will be repaired or replaced at the flat prices.

b. If more than three years old, such valves will not be accepted for replacement. New valves will then be supplied at regular prices.

6. Any valves returned at any time abused beyond repair cannot be accepted for replacement. New valves will then be supplied at regular prices.

7. Repaired valves or replacement valves will bear an "R" stamped on the valve body and the box will be stamped "Replacement." Replacement valves (thus marked) will not be guaranteed for any definite period but such valves, not more than three years old, will be repaired or replaced at the flat reconditioning charges.

AMERICAN INJECTOR CO.

American Injector Co.'s guarantee and replacement plan reads as follows:

Par. 1—Valves are guaranteed for one year of field operation, only, against defects in workmanship or materials will be repaired or replaced if, on inspection at the factory, the defects prove to be the actual cause of inoperation. An additional six months is allowed (in the guarantee period) to cover floating time in factory and on jobbers' shelves. The manufacturer to be the judge of cause of inoperation.

Par. 2—Valves inoperative due to causes beyond the control of the manufacturer, but within the guarantee period (18 months), will be charged at a flat price for reconditioning, or replacement. The flat price for replacement valves shall be less than the established resale price to the trade of a new valve, and to depend on type of valve. (See following notes.)

Par. 3—Valves beyond the guarantee period, but less than three years old, which are inoperative due to causes beyond the control of the manufacturer may, at the option of the manufacturer, be exchanged for a reconditioned valve at the same flat price as referred to in Par. 2, or be repaired at factory cost and billed accordingly.

Par. 4—Any valve more than three years old, or any valve abused beyond repair, regardless of factory dating, can not be accepted for replacement or credit by jobber, or manufacturer, nor given any price concession on a new valve.

Par. 5—It shall be optional with manufacturer to repair, or replace with a new valve, an inoperative valve in accordance with Pars. 1, 2, and 3; but all such valves are to be marked plainly with an "R," indicating "reconditioned" or "replacement" valves, and can only be sold at the reconditioned valve price when an inoperative valve is turned in at the time of the transaction.

Service Engineers Told To Take Aggressive Part In Licensing Plans

(Concluded from Page 1, Column 1)
over the registration at the 1935 convention in Detroit.

Paul Jacobsen, president of the society, declared that 10 new chapters have been added since the date of the last convention. There are now 1,100 members in the society, stated H. T. McDermott, secretary.

Service engineers in major cities were advised by George Uetz, president of the Memphis chapter, to take the lead in drawing up the proper type of licensing regulations for the repair and maintenance of electric refrigeration systems.

"The tendency of the public is to place the blame on the service or installation man when something goes wrong," said Mr. Uetz, "so it is up to the service engineer to see that proper licensing and regulating ordinances are passed so that accidents won't be caused by incompetent service men. Advantages of a good ordinance outweigh its cost to the service man."

The point was also made that licensing regulations properly drawn make the service engineer independent of any labor organization.

Local chapters were advised by Mr. Uetz to make themselves known both to the public and to city safety officials and politicians, so that they would be known as a strong, reputable organization when they "went to bat" to get the right kind of an ordinance. He said that the holding of the national convention in Memphis had attracted much attention to the society and its aims, and would aid the local chapter in its efforts to get certain clauses in a proposed local ordinance.

H. E. Adams of the Lewis Supply Co., Memphis, a member of the board of directors of the Refrigeration Supply Jobbers Association, addressed the convention on behalf of the jobbers association.

Mr. Adams told the service engineers that they should do more "reconditioning" work rather than mere repairing, and pointed out that there was much more profit in a reconditioning operation than in a mere servicing job.

Harry Drownes, member from Chicago, gave the report of the committee on uniform cost accounting system. He exhibited the simplified form which has been prepared, providing space for all proper bookkeeping entries that might be involved in a service or installation job. These forms, he said, are available through the national office of the society.

Joe Askin of Buffalo, chairman of the committee on adoption of uniform symbols, submitted a report which included a complete set of symbols for the approval of the convention. (Symbols will be shown in the next issue of AIR CONDITIONING AND REFRIGERATION NEWS.)

Four cities made strong bids for the 1937 convention. The decision as to where it will be held rests in the hands of the board of directors. The four cities bidding were Chicago, Cleveland, Pittsburgh, and Buffalo.

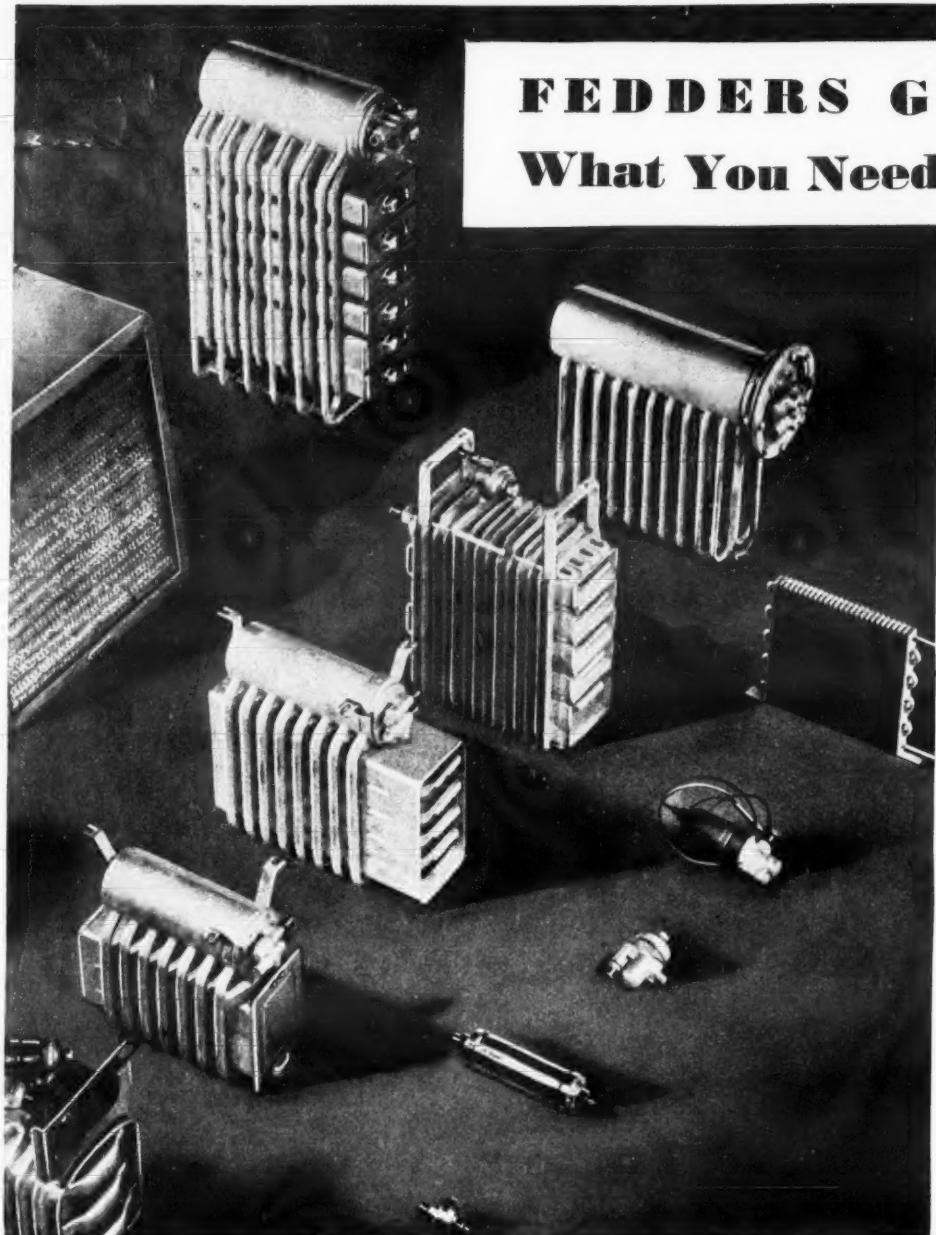
Paul Jacobsen of Chicago was re-elected president of the society; W. Hall Moss of Memphis, first vice president; Claude A. Brunton, Huntington, W. Va., second vice president; S. A. Leitner, Kansas City, treasurer; H. T. McDermott, Chicago, secretary; and E. A. Plesskott, Sergeant-at-Arms.

George H. Clark of Detroit was re-elected chairman of the national educational and examining board. In giving his report Mr. Clark said that the 1937 educational program of the Society will be extended to cover air conditioning.

Members of the society's board of directors will include: Warren W. Farr, Cleveland; C. O. McCauley, Pittsburgh; Don Shuster, Buffalo; C. Bushkopf, Beaver Dam, Wis.; and A. E. Doan, Toronto, Canada.

Exhibitors at the convention included the following concerns: Alro Supply Co., Alco Valve Co., Harry Alter Co., American Injector Co., Ansul Chemical Co., Automatic Products Co., Chicago Tubing & Braid Co., Copeland Refrigeration Corp., Curtis Refrigerating Machine Co., Cutler-Hammer Co., Detroit Lubricator Co., Dole Refrigerating Co., Fedders Mfg. Co., Frigidaire Corp., Fulton Sylphon Co., General Electric Co., L. H. Gilmer Co., Henry Valve Co., Imperial Brass Mfg. Co., Kellogg Compressor & Mfg. Corp., Kerotest Mfg. Co., Mario Coil Co., Mills Novelty Co., Mueller Brass Co.

Peerless Ice Machine Co., Penn Electric Switch Co., Perfection Refrigeration Parts Co., Ranco, R. & H. Chemicals Dept., E. I. du Pont de Nemours & Co., Inc., Rotary Seal Co., Skinner Chuck Co., Snap-On Tools, Inc., Standard Refrigeration Parts Co., Starr Co., Superior Carbon Products, Inc., Tecumseh Products Co., Virginia Smelting Co., Wolverine Tube Co., Zenith Carburetor Co.

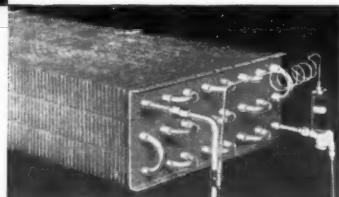


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BINGHAMTON, N. Y.
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A. E. Burden Co.
Melchior, Armstrong, Dessau Co.
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Parsons Bros.
BROOKLINE, MASS.
Refrigeration Supply Co.
BUFFALO, N. Y.
Fedders Manufacturing Co.
Beals, McCarthy & Rogers
Root-Nel & Co.
CHARLOTTE, N. C.
Henry V. Dick & Co.
CHICAGO, ILL.
Fedders Manufacturing Co.
Airo Supply Co.
The Harry Alter Company
H. W. Blythe Co.
Borg-Warner Service Parts Co.
George Monjian
H. Channon Company
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Fedders Manufacturing Co.
Merkel Brothers Co.
Deber & Company
The Harry Alter Company
COLUMBUS, OHIO
Hush-Peters Electric Corp.
DALLAS, TEXAS
Fedders Manufacturing Co.
Beckett Electric Co.
DAVENPORT, IOWA
Republic Electric Co.

DAYTON, OHIO
Allied Refrigeration Co.
DENVER, COLO.
Auto Equipment Company
DETROIT, MICH.
W. C. DuComb Company
FERNWOOD, MISS.
Enochs Sales Company
FORT WORTH, TEXAS
McKinley Refrig. Supply Co.
GREENSBORO, N. C.
Home Appliance Service Co.
HARRISBURG, PA.
Melchior, Armstrong, Dessau Co.
HEMPSTEAD, L. I.
Home Oil Burner Corp.
HOUSTON, TEXAS
Refrigeration Supply Co.
INDIANAPOLIS, IND.
Longenkamp Company
JAMAICA, L. I.
Home Oil Burner Corporation
KANSAS CITY, MO.
Forslund Pump & Mach. Co.
Naklin & Company
LANCASTER, PA.
M. & E. Refrig. Accessories Co.
LONG BEACH, CALIF.
Allied Refrigeration
LOS ANGELES, CALIF.
Fedders Manufacturing Co.
Franklin G. Siegel Co.
Pacific Metals Co., Ltd.
LOUISVILLE, KY.
Geo. Dehler, Jr. & Co.
MACON, GA.
Lowe Electric Co.
MEMPHIS, TENN.
United Refrigeration Supply
MIAMI, FLA.
Bernier-Peace, Inc.

MINNEAPOLIS, MINN.
Refrig. & Indust. Supply Co.
MONTGOMERY, ALA.
Touque Hardware Company
NEWARK, N. J.
T. W. Binder & Company
NEW ORLEANS, LA.
Enochs Sales Co.
The Spangler Company, Inc.
NEW YORK CITY
Fedders Manufacturing Co.
Melchior, Armstrong, Dessau Co.
The Harry Alter Company
Actua Supply Co.
Paramount Electrical Supply Co.
Serviceemen Supply Co., Inc.
PATERSON, N. J.
White & Shoups, Inc.
PHILADELPHIA, PA.
Fedders Manufacturing Co.
M. & E. Refrig. Accessories Co.
Melchior, Armstrong, Dessau Co.
Victor Sales Corporation
PHOENIX, ARIZ.
Pratt-Gilbert Hardware Co.
PITTSBURGH, PA.
William M. Orr Co.
PORTLAND, ORE.
Bill Hieber, Refrig. Supply Dist.
Stone Supply Co.
PROVIDENCE, R. I.
R. I. Supply & Engineering Co.
RICHMOND, VA.
Refrigeration Supply Co.
ROCHESTER, N. Y.
Melchior, Armstrong, Dessau Co.
Pfandler's Refrigerator Parts, Inc.
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The Refrigeration Store
SAN ANTONIO, TEXAS
Strauss-Frank Co.
Westbrook Carburetor & Elec. Co.

SAN DIEGO, CALIF.
Allied Refrigeration
SAN FRANCISCO, CALIF.
California Refrigerator Co.
Pacific Metals Co., Ltd.
Refrigerator & Power Spec. Co.
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Allied Refrigeration
SEATTLE, WASH.
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Refrigerator & Power Spec. Co.
SPRINGFIELD, ILL.
United States Electric Co.
SIOUX CITY, IOWA
Refrigeration Supply Company
SPOKANE, WASH.
E. S. Matthews, Inc.
Refrigeration Parts Supply Co.
ST. LOUIS, MO.
The Harry Alter Company
Brass and Copper Sales Co.
The Spangler Company
R. E. Thompson Co.
ST. PAUL, MINN.
Thermal Service Co., Inc.
SPRINGFIELD, MASS.
C. P. Payson Co.
SYRACUSE, N. Y.
Syracuse Supply Co.
TORONTO, CANADA
Davis Automatic Controls Co.
TUCSON, ARIZ.
Glover & Clark
WASHINGTON, D. C.
Refrigeration Supply Co.
WILKES-BARRE, PA.
Radio Service Co.
VANCOUVER, B. C.
Fleck Bros., Ltd.
WHITE PLAINS, N. Y.
County Seat Pkg. Supply Co.

FEDDERS MANUFACTURING CO. 57 TONAWANDA ST. BUFFALO, N. Y., U. S. A.

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Kelvinator cuts the cost of better living

The keynote of the Kelvinator program for 1937 will be—"Kelvinator Cuts the Cost of Better Living".

In a few short weeks you will learn about the program.

It will be welcomed by millions of families throughout America.

It will reach the people in your city, your town, your village.

It will herald a renaissance in the

standards of American living.

It will make possible for the man of average income such luxury as has only been dreamed of by the millionaire.

It will present an opportunity to salesmen, specialty dealers, department and furniture stores, public utilities, such as has not been known before.

You will want to know about it.

You will want to be part of it.

KELVINATOR CORPORATION

Detroit • Michigan

Greene Co. Capitalizes on Govt. Order; Toledo Dept. Store Aims At All-Electric Kitchen Market

By Winifred B. Hughes

Greene Experiences No Let Down in Fall Sales

TOLEDO—The fall hush on electric refrigeration sales that comes to most electrical appliance selling stores each year, suffered a sudden reverse here, as far as the J. W. Greene Co., Toledo Westinghouse distributor is concerned. "Business picked up considerably immediately after the News ran the story of Westinghouse's million dollar government order," Charles Dawson, assistant to Tom Mason, sales manager, told us.

Capitalizing on this big sale, the Greene Co. purchased 150 copies of the issue to send its dealers. A copy of a telegram informing distributors of the order and signed by J. F. O'Donnell, Westinghouse merchandise manager, is being sent with each copy of the News.

"Of course we can't play up the order in our advertising but the salesmen can use it in their sales talks, and tell their prospects of the government decision to give Westinghouse the contract in the face of a number of bids made by other manufacturers," Mr. Dawson explained.

Greene Has 125 Dealers

J. W. Greene Co. has been doing a good business during its 1936 season—the year's quota was made by June 23. Right now the distributorship is working in a contest which started Sept. 1, and has but one more week to go. Up to the present, Greene's is 40% ahead of other contestant distributors in Class B division of the contest.

Approximately 125 dealers located in 23 surrounding counties work under the Greene distributorship. In a recent sales contest for dealers, conducted by the company, 20 dealers came to Toledo to attend one of the 'Tigers' ball games, followed by an evening at Webster Hall, with all expenses paid.

Because most of the dealers interviewed in and around Toledo blame the price cutting situation on the distributor, this distributor representative's views cast a new angle on the situation.

Price Cutting Ruled Out

"We tell the dealer when we give him the franchise, that he's off our books if he cuts price. We try to select only those dealers who have a name for good merchandising policies to represent us," said Mr. Dawson. "Of course we can't play policeman in all of these outlying districts where small dealers are located, but we try to keep as strict watch over what they do as we can."

The distributor has about 10 dealers in the city of Toledo.

"We try not to crowd dealers here in the city. Whenever we are thinking

of appointing a new dealer, we try to get the opinion of the others before we make the appointment. We feel that to get one new dealer and lose three or four of our old ones—dealers who have been bringing in business for us—is bad policy."

No Retail Infringement

The Westinghouse distributorship maintains a retail store at its headquarters, but it endeavors not to infringe upon its dealers in sales closed by the home men, we were told.

The chief way which J. W. Greene Co. aids its dealers is through the work of wholesale salesmen who have charge of accounts in its territory.

"Their chief business is to educate the merchants, and to keep them posted on all new merchandising methods brought out by the factory," Mr. Dawson said.

In addition to this, sales schools are put on about three times a year, conducted by a Westinghouse factory representative. They are held over three-day periods, so that the dealers and their salesmen who are unable to come one day may come the next.

Greene's has a cooperative dealer advertising policy in which appropriations are made according to the earning power of the dealership.

"If they do a certain amount of business, they earn so much advertising which is run in the Toledo papers," Mr. Dawson told us.

Service Man Aids Dealers

The company maintains one service man who handles its business, and also goes out to help a dealer if he has a service call which he cannot take care of.

"He covers the whole 23 counties, and so you can see that we don't have a great number of complaints on the units we sell."

"We try to get all our dealers to take Air Conditioning and Refrigeration News. I started in the business about five years ago, and I've gotten most of my education on refrigeration from the News. It not only contains information on all the other makes of refrigerators, but it keeps right up with everything that happens in the industry," Mr. Dawson said.

LaSalle & Koch Planning New Kitchen Center

Charles G. Blackburn, buyer in charge of the electrical appliance department of La Salle & Koch department store here, has been with the company only since Sept. 15, so right now he's in the stage where he's formulating big plans for the department. At the same time, he's doing a merchandising job which shows a substantial increase over last year's business.

With G-E Nine Years

Associated for nine years with General Electric Co., Mr. Blackburn was first an independent dealer, after which he was for four years with Caswell, Inc., Detroit G-E distributor, where he was commercial and product manager. The last two and a half years he has been general sales manager at the H. G. Bogart Co., G-E distributorship in Toledo, which company he left to join La Salle & Koch.

His chief plan at this time revolves around installing a kitchen center at La Salle & Koch's. An all-electric kitchen, completely equipped, will be installed in a strategic first floor position near the door, by approximately Jan. 1. A home economist and a staff of floor salesmen will work at this display.

Purpose of this center will be to assist in designing and planning kitchens for both old and new homes, as well as to provide a recipe service for Toledo housewives.

Building Active in Toledo

Building activity in Toledo makes this idea seem imminently pertinent right now, Mr. Blackburn told us.

"In Ottawa Hills—one of the better residential sections of the city—there are about 35 homes being built at the present time, all of which will sell for around \$15,000," he told us. "These homes offer a ready market for assembled kitchen equipment sales."

Besides the kitchen planning center, the entire department is to be reorganized, and to be moved up to the seventh floor where the general offices are now.

"We are going to call the floor 'Electrical City,' and we will have an express elevator running right up to the floor," said Mr. Blackburn.

Programs, which will include home economist demonstrations, are to be featured regularly to attract customers to "Electrical City."

But while all these plans are being worked up, the department is still doing a bang-up business. Recently, during its anniversary sale, the 1935 record for this event was bettered by 196%, Mr. Blackburn said.

\$2,200 Worth Sold First Day

On Sept. 19, first day of the sale, \$2,200 worth of appliances were sold. The average sales check in the department is \$134.15 for this year, an increase of almost \$8 over the previous year's figure, when \$126.47 was the amount of the average sale.

Seven salesmen now work in the department where General Electric, Westinghouse, Crosley, and Frigidaire lines are carried. This staff Mr. Blackburn intends to increase to 12, and the men will then rotate working outside, following up contacts with the store's customers, and working on floor duty.

Mr. Blackburn's idea is that the only way to merchandise electric refrigerators, in a department store or anywhere else, is by having a well trained floor staff, and a staff that can get out and work on the outside also.

"I'm strongly in favor of salesmen training, rather than having a few men on the floor to wait until the customer comes in to buy, if she comes. I was educated that way my-

self, and I think that it's the only way you can sell," the store buyer said.

Looks to Distributor

"When I get new men I'm going to depend on the distributors and the manufacturers to help me train them. I'll contact the General Electric distributorship and the Westinghouse distributorship here, and arrange to have the men study their merchandising methods at their local headquarters. That way, they'll get a rounded idea of how to sell the products which we carry."

Mr. Blackburn thinks it's not a good idea to handle too many lines. He believes that carrying two standard lines and maybe a private brand or two is the best way to sell merchandise.

Another sidelight to the price cutting situation was opened up by Mr. Blackburn.

"I think that it's the department store's fault, this price cutting. Because it buys merchandise in large quantities, and therefore can offer special prices on models, it sets up a precedent which the small dealer has to meet to keep in business. My idea is to have good salesmen and sell on quality rather than to cut price, because it loses money for the dealer or for the department store in the long run."

Interest in Complete Kitchens

N. Weisend, who came to La Salle & Koch's as Mr. Blackburn's assistant, said that the department already has been getting a large number of inquiries on assembled kitchens.

He explained to us how the department store handling a number of lines can manage to do a balanced business in selling an even number of each line.

"When the customer comes in, you may show her one refrigerator and tell her about it. But maybe she will see another box close by that interests her. All the time you are telling her about the first, way in the back of her mind, she's taking in the second."

"So when you stand off from the boxes and look at them with her, you'll see her attention unconsciously focus on the other refrigerator. Then you say: 'Now this other refrigerator may be more what you had in mind.' This process, he thinks, is a more or less automatic one that comes from selling and more selling."

Appearance Important

Appearance plays a leading part in selling most of the refrigerators, he says.

"You go through five stages when you buy. First you have a need, then you see something that satisfies that need, then you have the time, the source, and the price."

"So suppose you wanted to buy a refrigerator. Well, you'd have the need. You see one you like, so you've passed the second stage. You are here, so this is the time, and you've looked around and decided where you wanted to buy your refrigerator; the only thing left to consider is the price. Your next move is to see what kind of a refrigerator you can buy for the price you can afford to pay."

The department now has a General Electric kitchen in the back of its section. Carried out in blue and cream color scheme, the kitchen, since it was installed, has proved a focal point of interest to Toledo housewives and shoppers looking towards building a new home, or to remodeling their kitchen.

Kitchen Department Planned

Both Mr. Blackburn and his assistant assert that Toledo presents an ideal market for the all-electric kitchens. One important part of their entire plan for the department's reorganization will be the creation and development of a kitchen department to get this coming business.

"The department store is the logical place for putting in a kitchen center. It not only has a complete line of kitchen equipment, but also the cabinets, floor covering, and other furniture and accessories needed in the kitchen. In our 'Electrical City,' the floor covering department will be located right on the seventh floor with the appliances," Mr. Blackburn said.

Service Station Dealer Sells 200 Refrigerators

Selling approximately 200 units during the summer, the R. H. McIntire Tire & Service Co., Frigidaire dealer here, had "a pretty fair season," Owner R. H. McIntire says.

Customers who stop to have their cars serviced or to purchase tires, often come into the store, where a large array of refrigerators is lined up against the back wall. Then, if they are in the market for a new refrigerator, the Frigidaire proof story puts them in the buyers' class.

During the rush season, the store had six salesmen who worked at selling refrigerators. Now, however, it has only one. Downstairs in the basement of the store, Mr. McIntire has a display room fitted up, where refrigerators, radios, washers, and other appliances are stocked. The room is furnished with comfortable wicker chairs, where prospects can sit down and think it over.

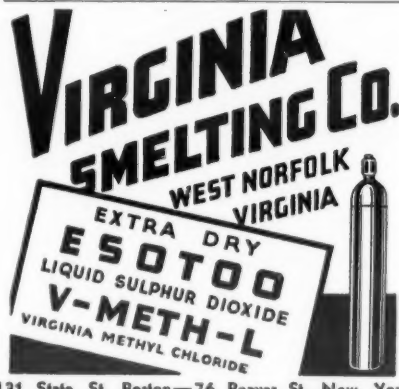
Display Room Downstairs

This arrangement gives the customers a better chance to choose their merchandise than when they are up stairs, where the appliance room is smaller and stocked with a variety of products, Mr. McIntire says.

While men may be the ones who first get interested in refrigeration through visiting the service station, they usually bring their wives to see the refrigerators before any sale is made, he told us.

The store recently added Combustioneer automatic stokers to its line, and as a result has sold a number of the units, in addition to handling a number of furnace sales for customers who decided that before buying an automatic stoker, they might as well get a new furnace.

A Combustioneer unit is displayed in the store, and the one operating in the basement is used to show prospects how the mechanism works. "When you can demonstrate the thing for them, people will buy much more quickly than when you just tell them about it," Mr. McIntire says.



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2 NEW EXPANSION VALVES FOR THE NEW YEAR

Two new expansion valves complete the popular A-P line which has won such universal preference because of incomparable performance. In addition to the Nos. 210, 215 and 220, there will be the Nos. 205 Thermostatic Expansion Valve and 206 Automatic Expansion Valve, both available early in the new year.

Model 205 Thermostatic Expansion Valve

All the advantages of the Model 210, but of smaller capacity— $\frac{1}{2}$ to 3-ton Freon. Has smaller bulb, giving quicker action. No piston or pin movement. Minimum friction. Extremely tight and positive shut-off. Not sensitive to rough treatment. Construction of this valve maintains its calibration. No bellows to break; no liquid carry-over on the off-cycle; practically fool-proof, and no service required.

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Model 205



Model 206

Model 206 Automatic Expansion Valve

Body of forged brass and built with the same precision as characterizes all A-P Valves. Unlike other expansion Valves of this type, moisture cannot get inside the hood, due to exclusive type of construction. This eliminates condensation and trouble due to freezing. Designed for $\frac{1}{2}$ to 3-ton Freon capacity.

ATTENTION! Distributors, Sales Agents and Dealers

● Nationally known concern manufacturing complete, well-advertised line of Soda Fountains, Carbonators, Fountain Parts and Dairy Store Equipment wants additional sales outlets at once. Here is a real opportunity for a big money connection with a firm acknowledged as the leader in its industry. Intensified coverage necessary as a result of comprehensive promotional activity planned to meet the rapidly increasing demand for this type of fixture. If you can handle an established line of equipment, designed for a sky-rocketing market, write, giving full particulars. Box 268.

Parts Makers Seek Greater Uniformity In Trade Practices

(Concluded from Page 1, Column 4)

which time the manufacturers discussed methods of maintaining resale price policies, and debated with jobbers over the matter of whether or not present resale price policies were proper.

Nominations for officers of the association for the coming year were presented to the convention by the nominating committee, which consisted of Tom Coyle, R. & H. Chemicals Department, E. I. du Pont de Nemours & Co., Inc.; J. L. Shrode, Alco Valve Co.; J. W. Hatch, Bush Mfg. Co.; W. A. Leonard, Imperial Brass Co.; and A. F. LaGess, Hinsdale Mfg. Co.

All three principal officers of the association were re-elected. These include J. D. Colyer, Wolverine Tube Co., president; J. S. Forbes, Kerotest Mfg. Co., vice president; and H. V. Higley, Ansul Chemical Co., secretary-treasurer. F. U. Webster, Cutler-Hammer, Inc., was re-elected to the board of directors.

New directors elected at the convention included M. R. Oberholzer, L. H. Gilmer Co.; Frank Riley, American Injector Co.; and Mr. Leonard.

Other members of the board of directors whose terms continue into the coming year include K. B. Thorndike, Detroit Lubricator Co.; Edward Gammie, Victor Mfg. & Gasket Co.; C. M. Brown, Tecumseh Products Co.; D. H. Daskal, Perfection Refrigeration Parts Co.; Charles W. Johnston, Virginia Smelting Co.

At Manufacturers Meeting

Alco Valve Co., St. Louis (J. L. Shrode, P. H. Thompson, and K. W. Way); American Injector Co., Detroit (F. B. Riley and O. F. Nelson); Ansul Chemical Co., Marinette, Wis. (H. V. Higley); Automatic Products Co., Milwaukee (E. A. Vallee and A. Brandt); Bohn Aluminum & Brass Corp., Detroit (T. R. McNamee); Chicago-Wilcox Mfg. Co., Chicago (E. J. Zoll).

Cutler-Hammer, Inc., Milwaukee (F. U. Webster and William Stark); Detroit Lubricator Co., Detroit (L. J. Knudson, K. B. Thorndike, J. W. Krall, Dan Wile, Tom Hart, and A. J. Michaelson); R. & H. Chemicals Dept., E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. (E. W. McGovern and A. P. Stetser); Dole Refrigerating Co., Chicago (H. E. Clay); Electromatic Co., Chicago (L. J. Pitcher); E. Edelmann & Co., Chicago (F. Q. Wray and E. V. Dunbar).

Fedders Mfg. Co., Buffalo (H. E. Rieckelmann and Joe Askin); Frederickson Co., Saginaw, Mich. (Karl A. Agricola); Fulton Syphon Co., Knoxville, Tenn. (R. S. Dawson and G. F. Price); L. H. Gilmer Co., Philadelphia (M. R. Oberholzer); Henry Valve Co., Chicago (Guy J. Henry and Charles V. Gary); Hinsdale Mfg. Co., Chicago (A. J. LaGess); Imperial Brass Mfg. Co., Chicago (W. A. Leonard, Harold McNellis, Charles H. Benson, Frank Wilson, and Mr. Miller); Jarow Products Corp., Chicago (Harry W. Jarow); Kellogg Compressor & Mfg. Co., Rochester, N. Y. (J. F. Weller and L. Browne); Kerotest Mfg. Co., Pittsburgh (J. S. Forbes, James Strachan, E. J. Kimm, T. F. Wilson, A. F. Fine, G. C. Taylor, and Van D. Clothier); Jas. P. Marsh Corp., Chicago (James Emmett, Jr., and F. L. Zicarelli); Maurey Mfg. Co., Chicago (Samuel R. Noble).

McCord Radiator & Mfg. Co., Detroit (C. McCoy and William Dunn); Mills Novelty Co., Chicago (Ray F. Polley, J. N. Kelley, and F. M. Duvall); Mueller Brass Co., Port Huron, Mich. (Fred L. Riggan, Jr., and Elgin Parker); Penn Electric Switch Co., Des Moines, Iowa (R. H. Luscombe and R. D. Marshall); Perfection Refrigeration Parts Co., Chicago (D. H. Daskal and A. A. Ways).

Peerless Ice Machine Co., Chicago (R. W. Kritzer and M. W. Knight); Ranco, Inc., Columbus, Ohio (G. E. Graff, J. D. Merkle, R. Dunlop, and C. M. Spillman); Rotary Seal Co., Chicago (Charles Muller, Walter Meir, and Hans Jensen); Spoehrer-Lange Co., St. Louis (H. F. Spoehrer and W. T. Carmody).

Tecumseh Products Co., Tecumseh, Mich. (C. M. Brown, F. K. Smith, and L. W. Larsen); Tagliabue Mfg. Co., Brooklyn (R. A. Skinner); Virginia Smelting Co., West Norfolk, Va. (C. W. Johnston, W. C. Dever, Roland H. Israel, and Robert LaBaron); Wolverine Tube Co., Detroit (J. D. Colyer, A. B. Hard, and A. S. Kingerley); Zenith Carburetor Co., Detroit (M. Swain and B. J. Carey).

Non-members attending the convention included: American Brass Co., Waterbury, Conn. (Merton B. Allan); General Electric Co., Cleveland (J. H. Stubbs and J. L. Smith); Refrigeration Engineering, Inc., Los Angeles (Walt Hancock); Refrigeration Appliances, Inc., Chicago (H. J. Krackowizer); and United Wire & Supply Co., Providence, R. I. (Mr. Dittmeyer).

Jobbers Outline Program To Gain Benefits from Cooperative Activities

(Concluded from Page 1, Column 5)

and the trade in general in the objects, purposes, and membership of the association.

Receiving tentative approval from the association was a group catalog purchasing plan whereby savings would be effected by quantity purchases. Under the proposed plan it would be optional to the jobber whether they would want a standardized catalog or a personalized catalog with the name of the jobber imprinted on it.

Catalog Plan

Catalogs purchased under the group plan will be proof checked and verified with the manufacturers specifications, and will be edited in accordance with the products handled by the individual jobber.

Jobbers exchanged information on the cost of doing business, in an effort to arrive at some figure representing an average cost of doing business in terms of a percentage of net sales.

Annual banquet of the association was held Wednesday night at the Peabody hotel. F. M. Cockrell, publisher of AIR CONDITIONING AND REFRIGERATION NEWS, was toastmaster at the banquet. In a brief address he described how the independent service man represented perhaps the only group of new business men that had grown out of the Depression, and he told the jobbers that it was their job to encourage the service engineer to be a "business man," and not merely a mechanic.

Other speakers at the banquet included J. D. Colyer of Wolverine Tube Co., president of the Refrigeration Supply and Parts Manufacturers Association, who pledged the support of the manufacturers; and H. S. McCloud, Williams & Co., Pittsburgh, retiring president of the association, who urged members to take a more active part in the affairs of the association, and to do their part in getting 100% membership of all jobbers eligible for the association.

New Officers Elected

Following the banquet the following were elected as new directors of the Refrigeration Supply Jobbers Association: Henry W. Merkel, Merkel Brothers Co., Cincinnati; Leo Gordon, Machine Tool & Supply Co., Tulsa, Okla.; and M. W. Applebee, Burstein Applebee Co., Kansas City.

Other directors whose terms carry over this year include: H. S. McCloud, Williams & Co., Pittsburgh; Robert Spangler, Spangler Co., St. Louis; J. M. Oberc, J. M. Oberc, Inc., Detroit; C. A. Kabat, Paramount Electrical Supply, New York City; H. W. Blythe, H. W. Blythe Co., Chicago; Irving Alter, Harry Alter, Inc., Chicago.

At a later meeting of the new board of directors, the following officers of the association were elected:

President, Robert Spangler, The Spangler Co., St. Louis; vice president, Henry Merkel; treasurer, H. W. Blythe, H. W. Blythe Co., Chicago; secretary, M. W. Applebee, Frank J. Gleason was re-elected executive secretary.

Companies represented at the Jobbers Association convention and firm members present included:

At Jobbers Convention

Aetna Supply Co., New York City (I. J. Fajans); Airo Supply Co., Chicago (E. P. Sorensen and C. E. Hamilton); Allied Refrigeration Co., Dayton (T. C. Bickel); Harry Alter Co., Chicago (Irving Alter); T. W. Binder Co., Newark (T. W. Binder and Harold Binder); H. W. Blythe Co., Chicago (H. W. Blythe).

Brass & Copper Sales Co., St. Louis (H. H. Hubbell); Bristol Supply Co., St. Joseph, Mo. (H. O. Bruess); Burstein Applebee Co., Kansas City (M. W. Applebee); Geo. Dehler, Jr. & Co., Inc., Louisville (A. B. Dehler and C. L. Bowling); Henry V. Dick & Co., Charlotte, N. C. (H. V. Dick); W. C. DuComb, Inc., Detroit (M. J. Laurie).

Enochs Sales Co., Fernwood, Miss., and New Orleans, La. (I. W. Lampton and W. S. Reeves); Forslund Pump & Machinery Co., Kansas City (L. H. Roberts and O. A. Forslund); Home Appliance Service Co., Inc., Greensboro, N. C. (W. H. Parker); Wm. F. Laramée & Co., Inc., Brooklyn (Wm. F. Laramée); F. H. Langsenkamp Co., Indianapolis (F. S. Langsenkamp, Jr., and J. A. Cassidy); Gustave

A. Larson Co., Madison, Wis. (Gustave A. Larson).

Lewis Supply Co., Memphis, Tenn. (H. E. Adams); D. C. Lingo Co., Houston, Texas (D. C. Lingo); Machine Tool & Supply Co., Tulsa, Okla. (Leo Garton and C. A. Sullivan); McKinley Refrigeration Supply Co., Fort Worth, Texas (J. McKinley); M. & E. Refrigeration Accessories Co., Philadelphia (H. A. Adams); Melchior, Armstrong, Dessau Co., Inc., New York City (H. A. Dessau); Merkel Brothers Co., Cincinnati (Henry W. Merkel).

Modern Household Appliances, Ltd., Montreal, Quebec, Canada (H. L. Milne); J. M. Oberc, Inc., Detroit (Joe Oberc and E. H. Davey); Paramount Electrical Supply, New York City (C. A. Kabat); M. D. Patterson Co., Atlanta (Robert M. Graves); Refrigeration & Industrial Supply, Minneapolis (F. R. Pond); Refrigeration

Products, Inc., Chicago (L. Russell); Refrigeration Specialty Co., Milwaukee (L. F. LaDue).

Refrigeration Supply Co., Washington, D. C. (M. J. Troutman); Refrigeration Supply Co., Sioux City, Iowa (C. W. Dennis); Refrigeration Supply Co., Dallas, Texas (U. C. Boyles); Refrigeration Supply Co., Richmond, Va. (G. W. Booth); Refrigeration Supply Distributors, Los Angeles (Fred Gennett); Republic Electric Co., Davenport, Iowa (E. L. Bengston and J. S. Kimmel); Root, Neal & Co., Buffalo (R. W. Adair).

Ruegg Refrigeration Supply, Lincoln, Neb. (C. S. Ruegg); The Spangler Co., St. Louis (Robert Spangler); Standard Refrigeration Parts, Chicago (Herman Goldberg); Thermal Service Co., Inc., St. Paul (H. W. Small); R. E. Thompson Co., St. Louis (R. E. Thompson); United Electric Service Co., Wichita Falls, Texas (S. A.

Gaines).

United Refrigerator Supply Co., Memphis, Tenn. (William Waters and Boyd Evans); United States Electric Co., Springfield, Ill. (J. W. Barnes); United Supply Co., Omaha, Neb. (Austin Jones and F. O. Jones); Victor Sales Corp., Philadelphia (H. A. Holcomb, Jr.); Vincent Brass & Copper Co., Inc., Minneapolis (Robert L. Vincent); Walter Refrigeration Supply Co., Houston, Texas (F. J. Walter); Westbrook Carburetor Electric Co., San Antonio, Texas (Clyde B. Westbrook); Williams & Co., Inc., Pittsburgh (H. S. McCloud).

NON-MEMBERS

Auto Equipment Co., Birmingham, Ala. (H. S. Banton); Interstate Electric Co., Shreveport, La. (J. A. Lee); R. F. Winterbottom, Waterloo, Iowa (R. F. Winterbottom); Refrigeration Supplies Distributor, Cleveland (James Downes).

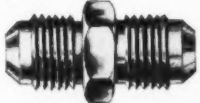
KEROTEST

Refrigeration Quality Fittings

MADE TO CONFORM TO THE STANDARDS
of the REFRIGERATION VALVES and
FITTINGS ASSOCIATION



Type U-1



Type U-2



Type N-4



Type C-1



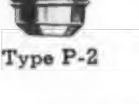
Type T-2



Type P-2



Type E-2



Type S-14

For the ultimate in dependability, specify Kerotest—the standard of quality throughout the modern refrigeration world . . . heavily constructed especially for Mechanical Refrigeration, Air Conditioning and High Pressure Bottled Gas Service . . . NOT to be confused or compared with the ordinary types of fittings.

The allowable tolerances and rigid inspections of Kerotest Refrigerator Fittings make them far superior to those used in low pressure work such as oil burner or automotive installations.

Complete data and specifications are listed in the Kerotest Refrigeration Catalog—a valuable booklet. Write for your copy, if you do not already have one.

KEROTEST MANUFACTURING CO.
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Grand Rapids, Mich. . . . Behler-Young Co.
Greenboro, N. C. . . . Home Appliance Service Co.
Harrisburg, Pa. . . . Melchior, Armstrong, Dessau Co.
Hempstead, Long Island, N. Y. . . . Sid Harvey, Inc.
Honolulu, T. H. . . . Theo. H. Davies & Co., Ltd.
Houston, Texas . . . Walter Refrigeration Supply Co.
Indianapolis, Ind. . . . F. H. Langsenkamp Co.
Kansas City, Mo. . . . Forslund Pump & Machinery Co.
La Crosse, Wis. . . . W. A. Roosevelt Co.
Long Beach, Calif. . . . L. B. Marsh
Los Angeles, Calif. . . . Refrigeration Service, Inc.
Macon, Ga. . . . Lowe Electric Co.
Memphis, Tenn. . . . United Refrigerator Supply Co.
Milwaukee, Wis. . . . Chase Brass & Copper Co., Inc.
Minneapolis, Minn. . . .
Minneapolis, Minn. . . .
Montreal, Quebec, Canada . . .
Newark, N. J. . . . T. W. Binder Co.
Newark, N. J. . . . McIntire Connector Co.
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New Orleans, La. . . . The Spangler Co.
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Oakland, Calif. . . . Pacific Tool & Supply Co.
Oklahoma City, Okla. . . . Mideke Supply Co.
Omaha, Nebraska . . . United Supply Co.

Peoria, Ill. . . . Isaac Walker Hardware Co.
Pittsburgh, Pa. . . . Williams & Co., Inc.
Philadelphia, Pa. . . .
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Portland, Ore. . . . Bill Hieber, 526 S. E. Wash.
Portland, Ore. . . . Refrigerative Supply Dist.
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Rhode Island Supply & Engineering Co.
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San Francisco, Calif. . . . California Refrigerator Co.
Sacramento, Calif. . . . J. N. Blair Co.
San Juan, Puerto Rico . . . Refrigeration Supply Co.
Seattle, Wash. . . . Refrigerative Supply, Inc.
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WOLVERINE TUBE CO.

1411 CENTRAL AVENUE

DETROIT, MICHIGAN

Around the World

With George F. Taubeneck

Considering the size of the market, the refrigeration business in Italy isn't bad at all—but American manufacturers don't get it. Two leading explanations may be found for this sad state of affairs: (1) governmental interference; (2) the temperament of the Italian people.

German manufacturers have apparently solved both problems. In order that American exporters may have data to study so as to develop their own solutions, Editor George F. Taubeneck's "Around the World" series will be devoted for three issues to a study of the Italian refrigeration market, the Italian government, and the Italian people.

Current instalment, which is the 47th in the "World Series" based on his recent seven-months' trip around and over the globe, winds up an account of the unique principality of Monte Carlo, and launches into the affairs of Italian refrigeration manufacturers.

Tops in Society

There are three grades of gaming rooms in the Monte Carlo Casino: free-for-all, exclusive, and ultra. To get into the first, you simply sign your name on a register, pass the casual scrutiny of a couple of clerks, receive a card, and present the card at an inner door.

To get into the exclusive rooms requires payment of a small fee. The "ultra" rooms generally seek recommendations and bills-of-character before admission cards are granted.

People who frequent these gaming rooms are not exactly a bunch of bums. The gambling fraternity as we know it in America—the checker-vested racetrack hangers-on, the touts, the gangsters, the sleek East Side Jews from New York, the horny little Italians, the loud grass widows, and the suddenly rich—doesn't seem to get over that far.

Gamblers at Monte Carlo are, in the main, genuine Society of the Continental variety.

Those who inhabit the unearthly villas are vintage royalists—both economic and political. Like "the Lowells who speak only to the Cabots, and the Cabots who speak only to God," the toniest of the world's social registerites have villas along the Riviera; the Nice and Juan-les-Pins residents aspiring to be spoken to by those from Cannes and Mentone, and people from the latter hoping to receive a stiff nod from the swanksters of Monte Carlo.

Before the war, I understand, you couldn't turn a corner in Monte Carlo without brushing by an archduke or a countess. That is still true; the only difference being that today the mob of bluebloods includes a flock of dethroned and exiled kings and queens.

Grading down from royalty in this carefully graded and stratified society are the outrageously rich, very rich, and the merely wealthy. Mixing through all the different strata are the current social lions of the Cole Porter and Fred Astaire variety, who are "taken up" because of artistic or heroic achievements plus a liberal polishing of *savoir faire*.

Bottom rung of the social ladder are those who come to Monte Carlo merely to gamble, and who crowd the tables grimly from opening to closing during their stay. Even these poor wretches would be considered very ultra-ultra back home.

During the winter "season," I was told, Monte Carlo is provided with flocks of pretty ladies—who toil not,

neither do they spin. They operate on the theory that if a man wins, he wants to celebrate; if he loses, he needs consolation. In either case, the gals just can't lose.

Inside Dope

European correspondents of American newspapers whom I met in Paris and Berlin told me that the famous Sea Bathing Society of Monte Carlo has become extraordinarily powerful in Continental politics. If a man loses a fortune and/or commits suicide, wires are pulled and the story is never printed.

If certain personages of royal blood are needed to lend atmosphere to the Casino, other wires are pulled, and the politicians ship over a few assorted barons and grand duchesses.

Often these titled folk can be persuaded to turn "shill" for a remuneration, one hears. A "shill," in case you haven't heard, is a person hired by a gambling house to play the various games, and thus, by mute suggestion, get others to play also.

Every night the "shill" arrives with empty pockets. He is furnished with a supply of money. After the casino closes, the shill turns back into the till whatever he has won, or what he has left. Then he gets his pay.

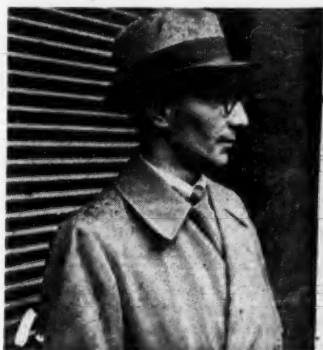
Sometimes the shill is enabled to win a tremendous sum (but not, of course, "for keeps"). That story is broadcast far and wide through the continental news services, and hopes spring anew in the breasts of those who have doped out systems.

Usually the shills are instructed to turn their attentions to tables where play is light, so as to attract more business there. It seems that gamblers love company. The more people crowd around a table, the more others will try to edge in, too—and vice versa.

A good croupier must have a fine mathematical mind, so as to be able to make rapid mental calculations. Inasmuch as the greater the turnover the greater the profit for the house is the rule, he must keep the play going as fast as possible while the crowd is around his table.

Croupiers are well paid, partly because good men are worth their salt, and partly to discourage temptations toward dishonesty. (Even so, their clothes—in Monte Carlo—are tailored without pockets!) They undergo long periods of training, have an opportunity to work upward in their profession, are generally inveterate gamblers themselves, and are usually

Milan—A Combination of Beauty and Industry



1. A. Tamai of the Westinghouse organization in Milan. 2. In the highly commercial and industrial city of Milan, a triumphal arch like the above is no mere ornament—it is commercialized. This one forms the entrance to an arcade of shops. 3. In this corner of the big Italian General Electric plant in Milan, compressors are made.

happy and content with their lot in life.

Suicides are a major problem at Monte Carlo. It is said that not more than a dozen or so of the annual toll really decide to end it all because of losses at roulette. The rest have already decided to commit suicide, and come to Monte Carlo to do it in order to camouflage the real reason.

Detectives infest the place—chiefly on the lookout for jewel thieves, who, of course, would find Monte Carlo the Happiest Hunting Ground if left to operate unmolested.

Lighting in all the rooms but the exclusive Cercle Prive would be considered all too inadequate by experts from Nela Park. It is yellow and dim, and comes from chandeliers bearing both electric and oil lamps.

Tables do not have legs, but each rests on a solid base, so that nobody may hide underneath and tamper with the wheels, or crawl around for dropped chips.

Guards stand vigilantly at strategic points every few yards; other "inspectors" circulate constantly. Photography is forbidden.

Final note: There are no taxes in Monte Carlo.

Other Monte Carlo Sports

Tennis at Monte Carlo, like the swimming, is something to write home about! They furnish dressing rooms with all the trimmings—showers, a good place to eat, access to the beach, and, believe it or not, telephones. Membership is not too dear, and guests are welcome.

Here are found the very best hard courts, and top-seeded players from all over the world make this their conditioning playground. But don't let that scare you away—there's always someone just a little worse than you are.

Although golf is not one of our hobbies, we were almost tempted to

take it up when we got a look at the beautiful links at Mont Agel. This magnificent course, overlooking the Mediterranean, is also an offspring of our friend Blanc's imagination. Golf enthusiasts play here the year round.

Pigeon shooting is very popular in Monte Carlo, and very social, for some unholy reason. The shooting grounds are located just below the Terrace, and the clatter of the guns can be heard all hours of the day. Money changes hands fast and sometimes furiously; small fortunes are made and lost within a few short hours on this unsportsmanlike sport.

If you have lots of money to spend in Monte Carlo, or if your system has just come through with a long run on the red, stay at the Hotel de Paris. This is probably the most expensive hotel in the world—and one is treated there like a king. It is connected with the Casino and the Sporting Club by passages so that, if your chief reason

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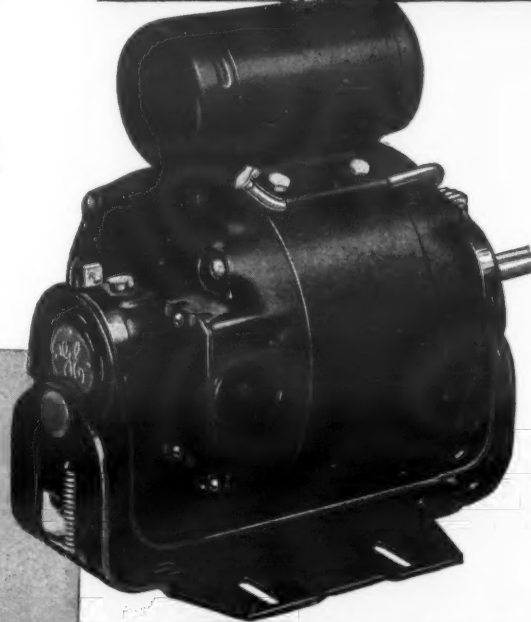
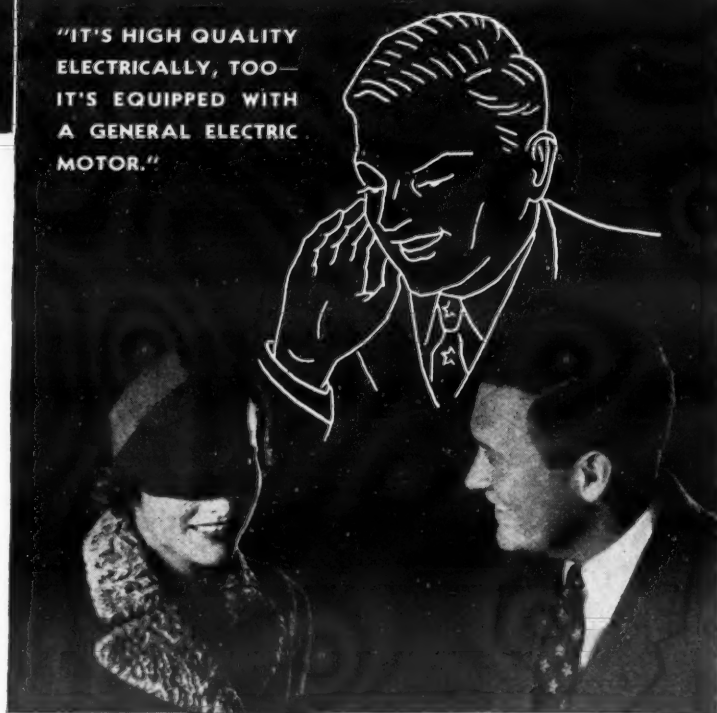
G-E MOTORS MAKE A GOOD SALES TALK BETTER

REFRIGERATOR dealers have found by experience that salesmanship alone will not gain a single customer unless that customer has confidence in the refrigerator—is convinced that the dealer sells high-quality products.

General Electric motors can help you convince your customers that the domestic electric refrigerators you sell will give economical and reliable service. Because the American public has become accustomed to coupling the name General Electric with outstanding achievements in the electrical world, it has come to associate General Electric with high-quality electric equipment. This reputation adds directly to the sales appeal of a refrigerator equipped with a G-E motor—inspires additional confidence that the refrigerator is dependable—makes selling easier, and hence more profitable, for you.

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"IT'S HIGH QUALITY ELECTRICALLY, TOO—IT'S EQUIPPED WITH A GENERAL ELECTRIC MOTOR."



LET G-E MOTORS HELP YOU SELL REFRIGERATORS

DO YOU KNOW that for nearly fifty years General Electric has helped materially to make possible the distribution of low-cost electricity to residential customers? The many G-E developments have helped to lower the cost of electricity and have stimulated the use of the electric appliances you sell.

GENERAL  ELECTRIC

070-161

Frigomat Factory and Its Leaders



1. Entrance to the Frigomat factory in Milan, which specializes in household refrigerators. 2. The Mayer family, which guides the destinies of Frigomat.

The Italy of Today Has a Character All Its Own



1. Indulging in the pleasant art of conversation—with gesticulation is the favorite pastime of the Italians. Here we have three business men of Rome. 2. Any doubts one may have entertained as to the militantly military nature of Italy are quickly dispelled by the number of armed soldiers that visitors encounter. 3. World famous, the cathedral of Milan is probably the most beautifully proportioned in Christendom. 4. Business being terrible for the top-hatted cab drivers of Milan, this one says, "Tell with it," and snoozes off.

(Concluded from Page 6, Column 5)

for being in Monte Carlo is the gambling table, and you dislike walking, you could ask for nothing better.

Riviera Palace Hotel, up on the hillside above Beausoleil, overlooking the sea, is one of the best bets. Much safer. It is out of the drugged atmosphere of the gambling rooms. The view from the Riviera Palace is like a page from a picture book.

Fairlyland Monte Carlo stretches below in all her unreal splendor. The gardens are made up of the rarest of shrubbery. Another good hotel, and cheaper, is the Royal Palace, which also commands a nonpareil view.

The gigolo business in Monte Carlo is very good. Probably the best set-up for "gigolism" in the world: Wealthy widows yearning for entertainment, poor young men willing to entertain (for a price), and oodles of entertainment on every hand. (Good work if you can get it).

The shows put on at the several nightclubs are exceedingly elaborate. Dancers are expensively attired. The latest dance steps are executed gracefully, acrobatically, or fantastically by entertainers from Vienna, Prague, Budapest, Bucharest, and New York.

Monte Carlo's general set-up is theatrical to the nth degree, and theatricals of many varieties—from an Earl Carroll girl show to authentic grand opera—are continually in vogue.

The contrast between Monte Carlo and the rock-perched little Capitol Hill village of Monaco is great. Monaco has not the artificiality—the child's storybook atmosphere—of Monte Carlo. It is "old world" and peaceful.

Monaco has a fine open-air restaurant near the gates of the palace, where we commoners may wine and dine cheaply beneath huge palm trees. Nearby is the famous Marine Museum where you can ogle fantastic sea monsters to your heart's content. A statue of Prince Albert in his yachting togs stands bravely in the entrance hall.

Then we have a collection of the best bones in captivity at the Anthropological Museum, if you like that sort of thing.

But the most interesting thing about Monaco is that shy castle, the House of Monaco.

At the top of the winding staircase inside this establishment, on the walls of the loggia, is depicted the life of Hercules who is the legendary founder of Monaco, and throughout the Throne Room and the various saloons are endless paintings which tell stories of love and war; portraits of princes and princesses—Charlotte de Gramont, Prince Louis I, the Duchess of Mazarin, and other members of the House of Monaco.

It is one royal castle you can explore without marking a week off your calendar; and still you can get the idea of how the bluebloods live—and what for—by roaming its extravagant layout.

No Business

Sales of American refrigeration and air-conditioning equipment in Italy are practically non-existent. Mussolini's government has placed a strict prohibition upon the import of automobiles, radios, refrigerators and refrigeration products, copper tubing, and supplies.

Other items of import, like foodstuffs and textiles, are placed on a quota system, something like that which obtains in France.

This does not mean that no refrigeration equipment manufactured in the United States ever finds its way to Italian shores. Once-in-a-while a household refrigerator, or even a piece of commercial apparatus, is allowed to enter. But for each piece of equipment a special permit must be obtained before it may be unloaded from a ship.

Those permits are difficult to obtain. If you have friends in the government, and can state a logical reason, you

may obtain a permit or two a year. You then pay \$35 for the permit, plus 20% tariff on the refrigerator, and wait patiently. The refrigerator may come through.

In the case of a Monitor Top G-E refrigerator obtained on permit, the lowest price which the Italian General Electric Co. can place on a 5-cu. ft. box after all charges have been paid is in the neighborhood of \$200.

Five or six refrigeration manufacturers in Italy together account for most of the 2,000 to 3,000 household jobs sold each year.

Commercial installations have hovered around the 10,000 mark annually for some years, with more than 100 different manufacturers contributing to the total.

Italian G-E

Around Europe one finds a number of manufacturing and selling organizations affiliated with the General Electric Co. of the United States. They import some equipment, manufacture most; and handle all mer-

chandising activities in their own manner. Generally they have mutual patent agreements and exchange-of-ideas arrangements.

Such a concern is the Italian General Electric Co. This organization, located in the thriving industrial city of Milan, imports household refrigerators whenever permits can be wangled, and manufactures its own commercial machines—which are exact copies of the American designs. "Everything electrical" is also manufactured in the Milan plant.

Next year this organization is planning to manufacture a household refrigerator powered by a conventional compressor of its own make. A 4½-cu. ft. box, it will sell for 4,250 lire (about \$325) with a one-year guarantee.

If as and when service troubles arise on a hermetically sealed refrigerator, the customer must be patient. It must be taken to the customs office, sealed, and shipped to America. After being repaired, it must be shipped back to Italy in the same seals. That takes at least four or five months.

Practically all service troubles on these machines have been located in the motor—rarely anywhere else.

All the Italian G-E machines use sulphur dioxide as a refrigerant, as do approximately 60% of the compressors manufactured in Italy. Some 30% use methyl chloride, the rest ammonia. They are just now beginning to experiment with Freon.

Very little air conditioning has been installed anywhere in Italy. Board-of-directors room at the offices of the Milano Power Co., big public utility, has been completely air conditioned by the Italian G-E company.

Schraemli & Foster, which manufactures Frigidaire products in Italy, has made a notable installation in Rome.

And that's just about the entire list of jobs which deserve the name, "air conditioning."

Cardenas of Turino is beginning to get into the business, specializing in elaborate ventilating machines which circulate air and water together through porous clay. Installations of this type have been made in a

number of Italian theaters.

Aeromeccanica Marelli of Milan has made some installations which draw air over direct expansion cooling coils.

Wait for Business

According to the Italian General Electric people, specialty selling is simply not done in that country. One waits for prospects to come into the office.

Household refrigerators are sold—or purchased—almost entirely by this passive method. A wealthy client hears about these newfangled refrigerators, calls up headquarters and arranges an appointment with somebody he knows. If he decides he wants one after looking it over, it then gets down to the question of what discount he is to receive.

The haggling may extend over quite a period of time, with the discount being based on the "stand-in" he has at headquarters, the amount of his other purchases from the company, or how important a man he is. Of this type of customer, 95% pay cash.

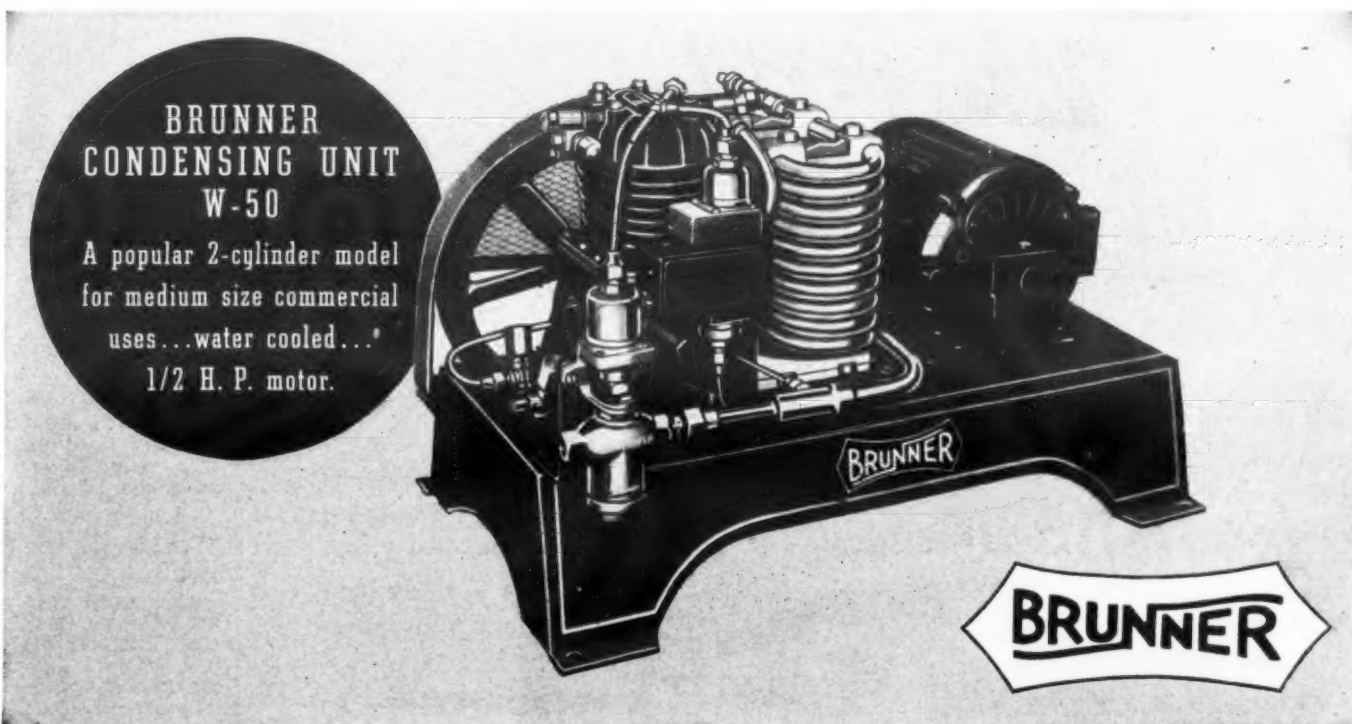
HERE'S THE SENSE OF *Oversize* CONDENSERS

Actually, the condensers on Brunner Refrigeration and Air Conditioning Units are oversize only in comparison with other types of construction. For, according to Brunner engineering experience, extra large condensers are an essential factor in obtaining that high refrigerating efficiency Brunner units are famous for. On Brunner water cooled units, the condensers are equipped with streamlined fittings, while on Brunner air cooled units, the

condensers are so shrouded that the fan guard also acts as an air control, effectively directing the air flow and further enhancing the overall efficiency. Study through Brunner features one by one: get acquainted with Brunner's complete construction, designed throughout for heavy duty service. Forty-seven condensing units, five compressor models; air and water cooled; in a range from 1/4 H.P. to 15 H.P. Write for illustrated catalog.

BRUNNER MANUFACTURING CO. * * * UTICA, N. Y., U. S. A.

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BRUNNER CONDENSING UNITS and COMPRESSORS

Text of FTC Complaint in U.S. Quarry Tile Case Which Defined Rights & Functions of Wholesaler Under Robison-Patman Act

(Editor's Note: On page 1 of the Oct. 28 issue was published a story telling about a complaint issued by the Federal Trade Commission under the provisions of the Robinson-Patman Act, charging the United States Quarry Tile Co. of Canton, Ohio, with discrimination in selling to jobbers who also deal with consumers, at a lower price than it sold its goods to contractors.)

Many observers believe that this complaint provides a clue to the course of future Federal Trade Commission decisions under the act, and think that it clearly designates that the wholesaler must be one who sells at wholesale only.

For the benefit of its readers, AIR CONDITIONING AND REFRIGERATION NEWS is publishing the text of the complaint. Substance of the charge is in Paragraphs 3 and 4.)

Complaint

In the Matter of
UNITED STATES QUARRY
TILE COMPANY

Docket No. 2951

Pursuant to the provisions of an act of Congress, approved June 19, 1936, Pub. 692 (The Robinson-Patman Act), amending Section 2 of an act approved Oct. 15, 1914 (The Clayton Act), the Federal Trade Commission hereby issues its complaint against United States Quarry Tile Company, stating the charges in that respect as follows:

Paragraph One: Respondent, United States Quarry Tile Co., is a corporation organized and existing under and by virtue of the laws of the State of Delaware with its office and principal place of business at 730 Renkert Building, in the City of Canton, State of Ohio.

Respondent manufactures, sells and distributes tile in commerce to its customers located in the several states of the United States causing said tile when sold to be shipped from its respective factories in the states of Ohio and West Virginia to the purchasers thereof located in the several states of the United States other than the states of Ohio and West Virginia.

Paragraph Two: In the course and conduct of its business as aforesaid, respondent is now and for many years has been in substantial competition with other corporations, partnerships, firms and individuals engaged in the business of selling and distributing tile in commerce between and among the various states of the United States.

Paragraph Three: In the course and conduct of its business as described in Paragraphs One and Two hereof, respondent since June 19, 1936, has been and is now discriminating in price between different purchasers of its said product of like grade and quality by giving and allowing certain purchasers of tile different prices than given or allowed other of its said purchasers, competitively engaged, one with another, in the resale of its product within the United States.

The discrimination in price herein referred to, is brought about by the respondent allowing a 15% discount on all glazed tile, regardless of quantity sold to so-called wholesalers, which discount of 15% is denied to

tile contractors. The said so-called wholesalers are in fact retailers in that they resell said tile to the ultimate consumer and are thereby in direct competition in the sale of tile with the tile contractors.

Paragraph Four: The effect of said discrimination in price made by respondent as set forth in Paragraph Three hereof, has been, or may be substantially to lessen competition, or to injure, destroy or prevent competition in the sale and distribution of the said tile and particularly between said wholesalers and said tile contractors; and the effect of said discrimination has been, or may be, to tend to create a monopoly in said favored customers receiving said discriminatory price from said respondent in the distribution of said product in the United States.

Paragraph Five: The foregoing alleged acts of said respondent are a violation of Section 2 (a) of said act of Congress, approved June 19, 1936, entitled, "An Act to amend Sec. 2 of the act entitled 'An Act to supplement existing laws against unlawful restraints and monopolies, and for other purposes,' approved Oct. 15, 1914, as amended (U.S.C. Title 15, Sec. 13) and for other purposes."

Wherefore, the premises considered, the Federal Trade Commission, on this 17th day of October, A.D. 1936, now issues this its complaint against said respondent, stating its charges in that respect as hereinabove set out.

Leonard Users Total 220 in Town of 300

WYCOFF, N. J.—Two hundred and twenty families in this town of 300 are users of Leonard refrigerators, according to Cordes Brothers, who established the first Leonard dealership in New Jersey.

Hans Cordes, who with his brother Otto operate the firm, attributes its lead in the sales field to service.

"We do not confine our sales talk to features, product, or company experience; we mention these points," he said.

"But we stress service and the efficiency with which it is rendered. After all, a refrigerator is purchased primarily with one thought in mind—food preservation."

Annual Cooking Schools Provide Prospect List for Westinghouse Dealer

COLUMBUS, Ohio—C. J. Rice, proprietor of Westgate Electric Co., local Westinghouse dealer, attributes a good many of his 200 annual refrigerator sales to prospects obtained at the cooking schools his company sponsors.

"We run a cooking school at least once a year," Mr. Rice declares, "that provides us with new prospects, and keeps the interest of the old."

Four outside salesmen are employed by Westgate Electric. They are: Ray Boyer, Car Scharr, Dick Fultz, and George Rinker.

Directory of Sales Training Films Is Issued by NRDGA

NEW YORK CITY—Titled "A Directory of Training Films," for store use, a publication claimed to be the first of its kind was released recently by the Personnel Group of the National Retail Dry Goods Association.

Listed in the directory are 76 moving pictures for the education of salespeople, states Otho J. Hicks, manager of the group. A brief description of the film's contents and sources from which they can be secured is included.

Three types of films are listed in as many sections of the publication. Among them are merchandise films and salesmanship films, under which are included such subjects as "The Art of Selling," and "Making a Sales Presentation Stay Presented."

No other listing of training films has been compiled, Mr. Hicks declared. The directory is to be distributed free to NRDGA members, while non-members may obtain it for 50 cents.

Winning of Electric Box Proves Embarrassing To Electrolux Dealer

DEL RIO, Tex.—Add to your list of embarrassing situations this one, encountered by R. E. Hurd of Texas Gas Distributing Co., Electrolux gas refrigerator dealer here.

The local American Legion post, in an effort to raise funds, recently bought an electric refrigerator as the first prize in a "raffle," on which chances were sold at 10 cents each.

More than 5,000 chances were sold, but when the winning ticket was drawn—you guessed it, Mr. Hurd was the winner!

What to do with it he has not yet decided.

Texas Utility Sends Trailer On Promotion Tour

FORT WORTH—Stopping at city festivals and county fairs as well as at all communities harboring company offices, the completely equipped electric kitchen-trailer of Fort Worth's Community Public Service Co. recently began a tour of company territory.

Twenty-six feet long, the trailer is divided into two sections. One unit contains the electric kitchen; the other is used for displays and demonstrations. Compact cabinets carry a complete supply of electric housewares which may be plugged into any of numerous outlets for demonstrations.

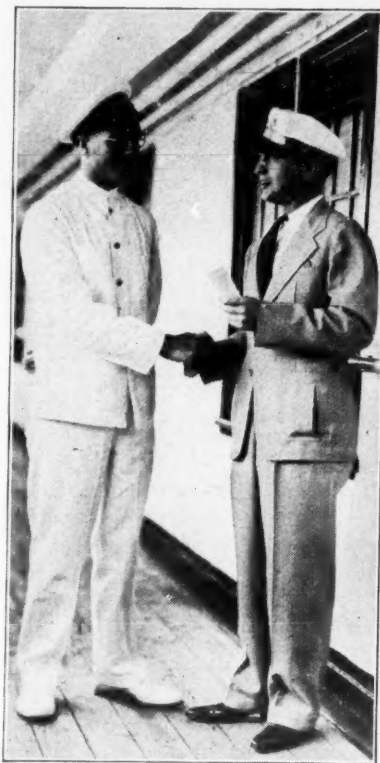
The coach is arranged to accommodate more than a dozen people, and is equipped with a combination radio and public address system.

Said to have attracted 187 visitors in 7 hours at its first stop in Glen Rose, Tex., the coach is expected to pay for itself through direct sales.

Warren Leaves Caswell For Newspaper Post

DETROIT—Harry E. Warren, sales promotion manager of Caswell, Inc., former General Electric distributor for Michigan, has resigned to accept a position in the display advertising department of the Detroit Times.

The First Order



Bugler William Stapleton (left) of the SS. Franconia bought the first Kelvinator washer during the Kelvinator Havana Cruise. V. J. McIntyre, manager of Kelvinator's washer and ironer division, is shown accepting the order.

Total G-E Sales Up 27% for 9 Months

SCHENECTADY—Sales billed by General Electric Co. during the first nine months of 1936 amounted to \$189,263,156, compared with \$149,173,275 during the corresponding period of last year, an increase of 27%, according to President Gerard Swope.

Profit available for dividends on common stock for the first nine months of this year amounted to \$26,533,667, compared with \$17,205,332 for the first nine months of last year, equivalent to 92 cents and 60 cents per share on 28,845,927 shares outstanding in each period.

A dividend of 25 cents per share of common stock was declared in September, payable Oct. 26 to stockholders of record Sept. 25, making a total of 75 cents per share for the first nine months of this year, compared with 50 cents paid for the corresponding period of last year.

Orders received during the first nine months of 1936 amounted to \$211,891,038, compared with \$158,943,765 for the first nine months of last year, an increase of 33%.

Crosley Adds Models To 1937 Radio Line

CINCINNATI—Several new models have been added to the 1937 line of Crosley radio receivers since they were first announced in June.

Among the models recently announced here are many console types. The new 15-tube console, listing at \$174.50, is followed by others of 13, 12 11, nine, and seven tubes, all having continuous coverage from 540 to 18,000 Kc.

All models receive American, foreign, police, amateur, aviation, and ships-at-sea broadcasts.

Other models range down to the Crosley Fiver, a five-tube table model listing at \$19.99.

8 Months' Georgia Power Sales Total \$267,860

ATLANTA—Salesmen in the commercial department of Georgia Power Co. have sold \$267,860 worth of electrical appliances and equipment during the first eight months of this year, according to a survey recently completed by the company.

Eight-months' sales in the various divisions of the company's commercial department are led by refrigeration, with a total of \$193,023. Water cooler sales for the period totaled \$31,948; air-conditioning equipment sales, \$12,949; water heaters, \$12,105; and cooking and heating equipment, \$17,833.

Garretts Opens New Store; Deas Named Manager

SANDERSVILLE, Ga. — Garretts Furniture Co., Leonard dealer here, recently opened a new branch store with William H. Deas as manager. This is the third branch store of the Garretts Furniture Co., and handles only electric appliances.

Christmas Kitchens To Be Featured in Holiday Drive

NEW YORK CITY—Associated Gas & Electric System is building its annual holiday sales campaign on Christmas Kitchens this year, with Dec. 1 opening day in the drive to sell a total of 13,565 appliances.

Refrigerators, ranges, and water heaters will get the spotlight throughout this drive. Breaking down the total number of appliances into two divisions, quotas for the contest are, in the electric group: refrigerators, 6,045; ranges, 1,587; water heaters, 778. For gas appliances: refrigerators, 507; ranges, 3,664; and gas automatic water heaters 984.

Special payment plans arranged on contest sales are: \$2 down payments, with one dollar minimum monthly payments and 48 months to pay, on ranges, water heaters, and on refrigerators not exceeding 5 cu. ft. capacity. On refrigerators of greater capacity, the payment plan is for 36 months, other terms being the same.

Like terms are applicable to gas appliance sales, with the exception that ranges sold in combination territory (where both gas and electric appliances are merchandised) have a 36-month plan, as do refrigerators exceeding 5 cu. ft. capacity.

On sales made on meter plans, no down payment is required, the minimum charge is 10 cents day, and the carrying charge one half of one percent.

Promotional plans include a tie-in with the National Better Kitchen Contest sponsored by Better Homes & Gardens.

This contest, held from Sept. 1, 1936, to August 31, 1937, offers five cash prizes varying from \$50 to \$500 for photographs of remodeled kitchen interiors, and five other awards for pictures of newly built kitchens.

Special Christmas window displays, holiday menu and recipe service, and newspaper advertising will feature the Christmas kitchen idea in individual campaigns conducted by properties and dealers of the Associated Gas & Electric System. To spur salesmen's efforts, the System is initiating a Reindeer Sweepstakes.

National advertising on modern kitchens being run in prominent magazines will be another tie-in feature available to dealers concentrating on making the drive clear their stocks.

HOW CAN I
GET RID OF
SERVICE
REPAIR
PROBLEMS



Swing OVER TO
Coolerator
The Air Conditioned Refrigerator



BIG FAMILY SIZE
SELLS
FAST AT... **\$79.50**

You pocket all the profit on every Coolerator sale—instead of squandering it on repairs. For this modern refrigerator has no machinery or moving parts to get out of order... never plagues you with service problems.

Exclusive features make it easy to sell Coolerator: air conditioned—washed, humidified, circulated cold air... "Fresher foods at half cost"... ice cubes in five minutes.

Backed by strong national advertising, already more than a quarter million Coolerators are now in use. They range from the compact 2½ cubic foot model to the huge 50 cubic foot commercial type. Prices start as low as \$39.75. It will pay you to write today for all the facts.

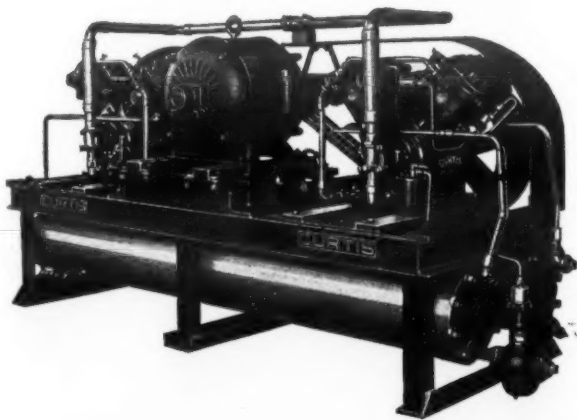
The Coolerator Company
Duluth, Minnesota

Why we say

"CONSULT YOUR LOCAL
CURTIS REPRESENTATIVE"—

● In every current Curtis advertisement to users of Curtis refrigeration and air conditioning equipment you will find the phrase "Consult Your Local Curtis Representative."

For Curtis sells only through its appointed representatives, not



through any other outlet nor direct.

Such advertising is just one example of the way this company is working to increase its dealers' sales and profits. It will pay you to investigate the Curtis merchandising plan of dealer co-operation. Write today.

CURTIS

CURTIS REFRIGERATING MACHINE COMPANY
Division of Curtis Manufacturing Company - 1912 Kienlen Avenue, Saint Louis, U. S. A.

Commercial Uses

Merchant's Needs and His Credit Rating Two Prime Factors in Commercial Deal, Says McCray Salesman Isbell

By Winifred Hughes

TOLEDO—"Best year we've ever had, even better than 1928 and 1929"—that, in a few words, characterizes the selling job which the McCray Refrigeration Co. branch here has done during 1936, according to F. I. Davison, branch manager.

Mr. Davison, who has been in the Toledo McCray branch for approximately 15 years, recently was prize winner in an eight weeks' sales contest, selling \$35,000 worth of equipment.

The contest, held for the entire McCray organization throughout the United States, followed a baseball hitting pattern, and was divided into two laps, with the personnel grouped into two divisions. Branch managers and distributors were in the major league, while salesmen were in the minor league.

R. W. Reid, one of the Toledo branch salesmen, was among the first 10 minor league winners.

Mr. Davison was just about to leave on a business appointment when we called, but R. H. Isbell, salesman, told us what the company has been doing during the last few months.

20 Units in New Restaurant

One of the biggest McCray installations made here during the past year was that in Toledo's new, modern air conditioned restaurant and cafeteria, run by Grace E. Smith, where over 3,000 people eat meals daily. Twenty McCray units were installed, and they included seven walk-in coolers, an equal number of reach-in boxes, ice cream coolers, and other equipment, Mr. Isbell explained.

The installation also includes a cold plate display window in which salads and other perishable foods can be displayed for passersby.

Between 15% and 20% of installations made by this company are in new stores or markets just opened. The replacement market covers the other business.

Confidence Builds Business

Having the confidence of your customers, in Mr. Isbell's opinion, is the best way to build up future business. This means seeing that every unit installed gives satisfaction.

Mr. Isbell thinks it difficult to put your finger on an exact mode of sales procedure in selling commercial equipment.

"Every new customer means a different problem, and you decide what methods to use in selling him when you are there talking to the prospect,"

when you have sized up his requirements," he stated. No two commercial salesmen, he believes, sell merchandise in exactly the same manner.

He gets most of his sales—and his sales for the last fiscal year averaged \$1,000 worth of equipment for the 52 weeks—from first making friendly business calls on prospects, then calling back from time to time.

From this beginning sales materialize—although it is sometimes two or three years after the first call that the customer gets around to buying the equipment. When the merchant is really interested in buying, it doesn't take so very much straight selling talk to clinch the deal, Mr. Isbell thinks.

Long Contact Worthwhile

He told us about one customer whom he had contacted first about three years ago. Last week the man came in to see the equipment again. A follow-up call at his store a couple of days later, at an appointed time, resulted in a signed order.

The friendly approach, in which no pressure or forceful sales talk is used, seems to strike an interested response in his prospects' minds, Mr. Isbell states.

"One man I went to see last week said: 'I'm going to do something about changing my refrigeration, and I like the way you have gone about selling. Come in and see me in about a month.'"

On the other hand, another McCray salesman, who has a large volume of sales to his credit, uses an entirely different process—he keeps doggedly on the customer's trail until he buys, Mr. Isbell explained.

One Salesman Only

And two salesmen can't work together on a single sale. "I think it is better for neither of us to go after it, than for two of us to try at once," explained Mr. Isbell, illustrating with his fingers how the sales methods followed by the two men would clash rather than intermingle.

Getting right down to the selling work, the first thing you need to do in a sale is find out what equipment the merchant needs. The next step is to see if he can handle it financially, according to Mr. Isbell.

"I think the biggest problem connected with selling commercial refrigeration is financing. You've got to be able to arrange terms that the prospect can meet, and you have to

be sure of his credit standing, in order to protect yourself."

More commercial equipment is being sold now because the exterior of refrigerated units has been greatly improved, and because commercial salesmen have had more experience with merchandising methods, this salesman believes.

Butchers and grocers today have a greater need for attractive 10 or 12 ft. display cases because young housewives have not been trained how to buy foods, says Mr. Isbell. They want to see the different foods and be able to make up their minds in the store, instead of planning what to buy before they come to shop, as housewives of an older generation were accustomed to do.

Attractiveness Sells Foods

"Lots of them are college graduates who have had no particular instruction in how to buy. Of course some of them have. But they seem to pick the stores where foods are attractively set up and correctly refrigerated. The merchants know this, and they realize that getting attractive display cases helps to get new business."

"When I'm making a sale I always try to take my prospect to see another merchant who has bought the type of equipment he wants. Then I just stand back and let the two of them talk. When it is impossible to take him into another merchant's store, I bring him down here to the display room to see the equipment."

Evidences of how successful this plan of making one installation lead to another can be, is the fact that McCray has installed equipment in eight shops in one block on Bancroft St., and has another installation farther down on the street. On La Grange St., Toledo, McCray equipment has been installed in three shops located in the 500-600 block.

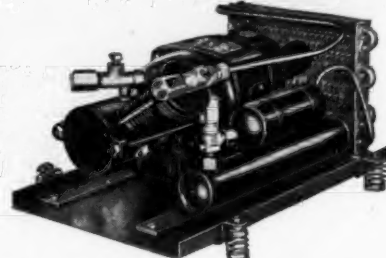
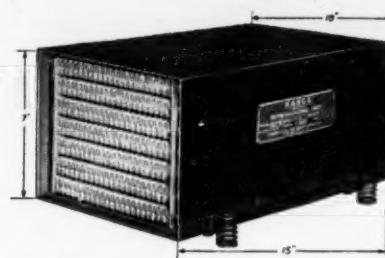
Good Back-Bar Market

McCray has installed approximately 40 back bars in and around Toledo, many of which were sold by Mr. Isbell. These are made by installing coolers in which kegs of beer can be placed inside, and taps installed outside. In this way the beverage is kept cooled, and the restaurant proprietor can draw off as much as he needs to serve. Shelves are arranged inside the cooler so that other liquors and wines can be stored there.

The smaller store is target for most of the sales efforts of McCray salesmen, rather than the hotel trade.

"Hotels always want special prices on their installations. This means a

New Commercial Refrigeration Co. Units



Picture at the left shows unit enclosed in soundproofed hood, while picture on right shows details of compressor construction.

cut in the commission on the sale, so most salesmen don't concentrate on this type of business."

Mr. Isbell doesn't believe that it's a good idea to paint too glowing a picture when selling equipment.

"For instance, I sold a unit which we had taken in on a trade-in. The man bought without having first seen it. I didn't lead him to believe that the unit was too much like new, and he was pleased when he saw the good condition it was in. That's another help towards new business."

Giffel Body Introduces Refrigerated Truck

TERRE HAUTE, Ind.—Giffel Body Mfg. Co. here recently introduced a new refrigerated truck having a storage space of nearly 350 cu. ft., and a capacity of 6 tons. The chassis is an International.

Two Kold-Hold cooling units and a 1-hp. Kelvinator condensing unit furnish the refrigeration.

Walls and roof are insulated with 4 inches of Dry-Zero. Floor is insulated with 4 inches of cork. All insulation is aided by a layer of aluminum paper.

Carrier Refrigeration Used At Clipper Pacific Bases

NEWARK — Carrier refrigeration serves both passengers and personnel of Pan American Airways' China Clippers when these trans-Pacific planes stop at their island bases at Midway, Wake, and Guam.

Carrier equipment is also being used to condition the entire second and third floors of the new Pan-Air do Brazil Terminal at Rio de Janeiro.

Commercial Line Introduced by Rochester Co.

ROCHESTER, N. Y.—New direct-driven commercial condensing units with construction features which afford compactness and quiet operation, have been introduced by Commercial Refrigeration Co., Inc., here.

Model MRK-SR can be had with either a 1/2-hp. or a 3/4-hp. motor, and is designed particularly for replacement purposes. The entire unit is housed under a sound-proof metal hood, and stands only 7 inches high.

Model MRK-JR can be applied whenever a 1/2-hp. unit is required. Simplicity of construction marks these new units. Only two horizontal and two vertical tie bolts hold the compressor parts and compressor assembly in alignment with motor shaft and detachable cylinder, and cylinder head with the crankcase.

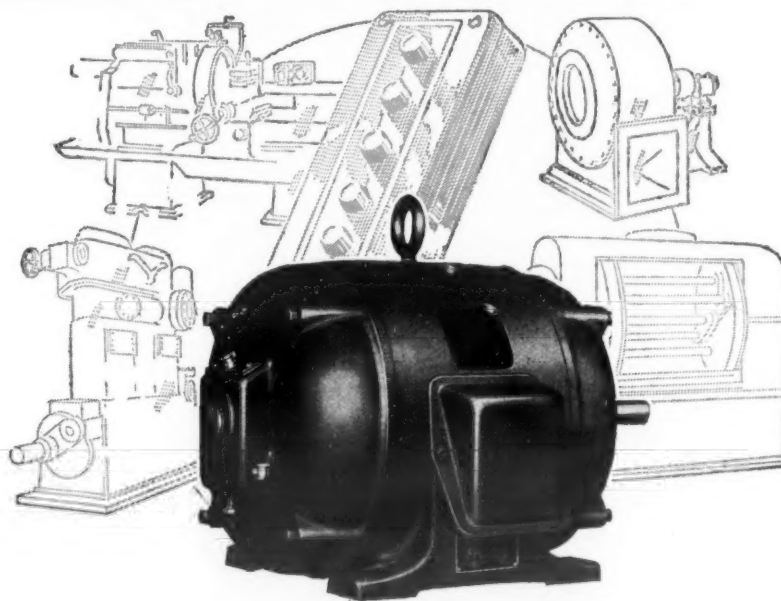
The compressor assembly is entirely independent of the motor, making it possible when necessary for the complete compressor assembly and motor to be changed independently.

The exclusive Commercial radial crankcase design permits tilting of the cylinder from a vertical position to a 45-degree angle, right or left, in order to save head space.

There are no tap holes in the entire compressor assembly, ensuring a seepage-proof unit.

Christiansen Joins A-P

MILWAUKEE — H. Christiansen, formerly testing engineer with the Underwriters' Laboratories, is now a member of the sales force of the Automatic Products Co. here.



8 Motor-Speed Changes with Finger-Tip Control

You can get as many as 4 predetermined speeds with a single Century Multispeed Induction Motor—simply by pressing a conveniently located button!

Or, you can get as many as 8 speeds with a single Century Multispeed Induction Motor, when combined with a 2-speed gear head!

Naturally, by having speed-change control in your motor, you save the expense of building it into your machine. Also—you get the same dependable performance that has always characterized Century Poly-phase Motors.

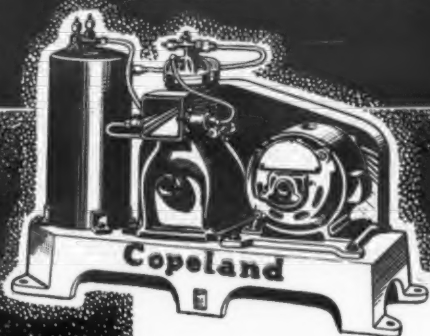
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PERFORMANCE

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Over!



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Copeland
DEPENDABLE Electric REFRIGERATION

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National Exposition Idea Revived

MANUFACTURERS and jobbers of refrigeration and air conditioning parts, materials, and supplies, who exhibited and convened in Memphis last week in conjunction with a national gathering of refrigeration service men, learned four definite lessons about exhibitions. The next one, they aver, will:

1. Be bigger.
2. Last longer.
3. Be staged later in the year.
4. Be more showmanlike.

Taking the last consideration first, it was the reaction of most of the exhibitors that they had expended sufficient thought toward making their exhibits attract attention, and toward making them reflect the character of the companies which sponsored them.

The one or two notable instances of showmanship displayed elicited such a definite response and approval that practically every exhibitor is convinced that an investment in a really attractive and arresting exhibit next year will be well repaid.

Considerations 1 and 2 hinge somewhat on consideration 3. If individual exhibits are to be more spectacular, the exhibition itself must be bigger. Ample space is needed; more manufacturers should contribute displays; entertainment and publicity should be employed to bring a large flow of customers through the doors.

Suggestion No. 3, that the exhibition be held later in the year, comes because many of the manufacturers found it necessary to display 1936 models at Memphis, inasmuch as their 1937 products were not yet ready.

Finally, if the exhibition of refrigeration and air-conditioning parts and equipment is to be made so much better and bigger, it should be kept open for several weeks, in order that customers and prospects might come from all over the land to see what's offered.

The number of service men who came to the Memphis show from long distances, and the size of the orders they placed, was an eye-opener to manufacturers and jobbers. Some of these well-traveled customers made the point that in the last year or so it has become necessary for them to buy equipment "sight unseen."

The rapid development of the

arts of refrigeration and air conditioning, the multiplicity of new designs and features which have been introduced into various products, the claims and counter-claims of a whole new flock of inventors and makers, have made it very difficult for jobbers and service men to keep pace with equipment.

These men feel a very definite need for some sort of cooperative exhibition where they could go to see displays of all the new parts, supplies, and equipment, instead of just ordering blindly from a catalog, or from the enthusiastic verbiage of a salesman or a promotion piece. Especially do they feel the need to compare and to weigh the respective merits of competing products.

All-Industry Show Proposed by the News

Almost a year ago (Dec. 4, 1935) the NEWS outlined in this column the growing need for an All-Industry Refrigeration and Air-Conditioning Exposition.

It was pointed out that many factors were pointing toward a building boom, to begin in 1936 and get going really well in 1937. Such an exposition could help make clear to the public the truism that "no new building should be put up without air conditioning," and that all present structures in which human beings live and work are obsolete unless they have been properly air conditioned.

Detroit was suggested as an ideal site for an exposition to dramatize this all-important idea, because it comes close to being both the geographical and actual center of the refrigeration industry, and because it has led all cities of the nation in industrial activity and recovery.

The predicted building boom materialized, but the exposition, for one reason or another, didn't. Exhibitors at the "little show" in Memphis last week recalled the suggestion, and put it up to the publisher of the NEWS to revive the idea.

Educating the Public On Air Conditioning

What value such an exposition might have to jobbers, service men, and dealers has been discussed in preceding paragraphs. Educational worth of the proposed show to ultimate consumers seems even more obvious, especially in the case of air conditioning.

By means of a big exposition, conceived and executed in a dramatic, showmanlike manner, it could be shown to the public that air conditioning has definitely arrived, that it is an accomplished fact, and not just something which "will be swell when they get it perfected." All types of equipment should be in operation, with trained lecturers in attendance to explain exactly "how it works."

Movies, demonstrations, visual education of every description should be provided, so that the black mask can be taken off the face of air conditioning for the average citizen. People should be able to see, feel, understand, and buy air-conditioning and refrigeration equipment at an exposition of this nature.

Property owners and renters should be inoculated with the germs of a belief that in order to protect their investments it will be necessary for them to install air-conditioning systems and adequate refrigeration facilities in all the dwellings they control.

Most important of all, every person who visits the exposition should be made to go home with the idea firmly embedded in his mind that any human habitation built from this time henceforth must be air conditioned.

As for displays of household refrigerators and commercial equip-

ment, that idea is not at all new. Cooperative displays have long been sponsored by public utilities and electrical associations.

However, in almost every instance, the refrigeration exhibits have been the tail to somebody else's kite—chiefly radio. Surely the time has come when refrigeration is big enough and important enough to hold its own show. Imagine the automobile manufacturers staging their annual shows in conjunction with oil burners or radios!

Critics of this suggestion may doubt that large numbers of prospects will be able to come to Detroit from the far corners of the nation. Indeed, that may be true; but Detroit is the center of a great concentration of prospects. Furthermore, the initial exposition in Detroit can serve as a model for similar expositions in other metropolitan centers. Exhibits could be designed in knock-down style, so that they could be shipped from exposition to exposition.

None of the manufacturers who had exhibits down at Memphis will doubt that the TRADE would come to the Detroit show. And it is upon contractors and dealers that the manufacturers must depend to get their story across to the public. If the exposition does nothing else but educate the nation's dealers, it will have been well worth staging.

As an opportunity to do a master educational job—results of which should loom up impressively in the sales figures of the refrigeration and air-conditioning industry in the years immediately following the exposition—such a show seems to be so timely and needed an idea that the industry cannot afford to neglect it.

"Quoted"

Sootfall

ONE thing that makes us all quite sick and unhappy is soot. The sootiest place in town is the East Side, from Kip's Bay, a little south of Morgan's house, up to Carl Schurz Park. Here the annual sootfall is over 150 tons to the square mile. No other section of Manhattan can touch it, or wants to. The least sooty district is the neck of land between the Harlem River and the Hudson. Marvellous place to dry clothes, up there. By going down to 139 Center St. and talking with Arthur C. Stern, head of the WPA Air Pollution Survey Project, we collected some arresting facts about this whole dirty subject. The WPA has been leaving little round copper cans on rooftops about town, and though these cans have not provided an absolutely perfect index of sootfall, nevertheless some valuable information has been obtained.

Smoke is, of course, at the bottom of pollution. The power plants of the Edison company along the East River belch smoke throughout the year, which is one reason for the East Side—sometimes called the "fashionable" East Side—getting so much soot. Of dust, there is plenty in the air, but you have to have dust to have rain-fall, or to have colors in the sky. There's even dust at sea. Anything is dust that gets below one one-thousandth of a millimeter in diameter and starts blowing around. In dust you have a wide variety of substances: manure, gold, pieces of skin (heavy during the sunburn season), pollen, Sherwin-Williams paint, bacteria. Mr. Stern believes that you can't tell much about the origin of a dust particle by examining it under the microscope. Pollen, however, is cute under the microscope; the pollen of the ragweed looks like a little golf ball with spikes—and we hay-fever sufferers wish it was a little golf ball with spikes.

Exhaust gases contribute enormously to air pollution. Only the fact that they diffuse readily in sea wind makes this island even remotely habitable. Carbon monoxide is odorless, and although it is a deadly gas, it is usually not the cause of the headaches and nausea which beset people in the fine, modern, streamlined, vibrationless buses which now ply our streets, trailing their nastiness behind them. Aldehydes are the headache producers, in case it comforts you to know their name.

Now we come to bacteria. Ready

with masks! The WPA has sucked in air from schools, subways, theaters, and has analyzed it. The highest concentration of bacteria was found in school air. Next, the subway. Then theaters, streets, parks. Auditoriums of non-ventilated theaters, such as most of the legitimate houses, contained more bacteria than streets and parks; more, in fact, than the ventilating ducts of ventilated theaters. Pneumococci and Alpha and Beta streptococci were found in large numbers. The normal habitat of most Alpha hemolytic streptococci from schools and subways is the human nasopharynx, as you have probably discovered on your own hook.

That about covers air pollution. Now to do something about it.—From *The New Yorker*.

Letters

How Does the News Get into Sing Sing?

State of New York
Department of Correction
Sing Sing Prison
Ossining

Nov. 4, 1936.

Publisher:

One of the strong points in our program of vocational education is the opportunity for training in the Electric Refrigeration class, which we are able to carry on largely through the generous cooperation of the leading manufacturers.

Among other things we have not as yet obtained provisions for securing current literature in the vocational fields. Occasionally a copy of REFRIGERATION NEWS has found its way to our library and upon turning the issue over to the refrigeration class, it has created so much interest that I am taking the liberty of asking whether it would be possible for you to send us your magazine; back issues, or copies after the sale period is over.

I trust this request is in conformity with your policy.

LEWIS E. LAWES, Warden,
by JAMES DAWSON, Librarian.

Answer: We have accumulated a large quantity of back issues during the past 10 years and would like to dispose of surplus stock where it will do some good. We will gladly send an assortment to any school, library, or other public institution, provided the shipment may be made by express or freight collect.

No Free Subscriptions To Clipping Bureaus

R. H. BACON & Co.
Business Paper Editorial Service,
Surveys, and Reports
221 North LaSalle St., Chicago
Nov. 12, 1936.

Publisher:

Our clipping bureau covering the business and trade paper press handles so much work for advertising agencies that most of the publishers now put us on the agency list for a regular checking copy.

A number of agencies are calling our attention to the fact that we are missing items in AIR CONDITIONING AND REFRIGERATION NEWS. This brings up the question as to whether you might be willing to put us on your list.

This clipping bureau is strictly a cooperative undertaking. We read only those publications where the publishers feel that the possible benefit warrants sending us a regular checking copy. On this basis we now receive practically every paper listed in the business paper section of Standard Rate and Data Service.

A great deal of our work covers the clipping of all competitive advertising for the clients of various agencies. Frequently these studies lead to broadening the program to include more space and more publications. There have been many cases where we know the service has been helpful to the business press in competition with direct mail, radio, newspapers, and other forms of advertising.

We have found no possible way to build the service on a basis where we could enter our subscription for nearly a thousand papers. On the other hand the cost to each publisher for our checking copies is negligible and the benefits easily justify the cost.

We are anxious to render you a valuable service and at the same time give our agency clients a complete coverage of each field. In order to do that we should have AIR CONDITIONING AND REFRIGERATION NEWS and we are hopeful that you will feel justified in adding our organization to your agency list.

R. H. BACON,
Editorial Director.

Answer: Your clipping bureau may be a "cooperative undertaking" but that does not qualify it as a charitable institution. If your clients have a sufficient interest in this industry to justify keeping tabs on the advertising of competitors, they should be able to pay for the service.

Lindsay Asks How Government Will Check 10-Year Guarantees

Dry-Zero Corp.
"Dry-Zero"

High Duty Insulation and Products
Merchandise Mart
Chicago, Ill.

Nov. 10, 1936

Editor:

The government's method of obtaining bids on the 16,697 refrigerators to be used in 34 Federal housing projects puzzles me.

No one can assail the logic of basing the bids on the price of the refrigerators plus the expense of operation over a period of 10 years. Certainly this should represent the true cost of each refrigerator. Furthermore, the price obtained in this manner is bulwarked by a guarantee from the manufacturer that the operating cost of the refrigerators will be as represented. The guarantee includes a penalty if the kwh. consumption exceeds the guarantee.

What puzzles me is the manner in which the current consumption figure is calculated and how the government is to be sure the guarantee is not exceeded during the 10-year period. The specifications state that four performance tests are to be made by the manufacturer in his own laboratory subject to a later check by the government.

So far as I can learn these four tests are simple hot-room tests run on new refrigerators for 24 hours under varying heat-load conditions. Such tests reveal the efficiency of the refrigerator when new but give no indication whatever of the efficiency of the box after even 2 years of service, much less ten.

Therefore, it is ridiculous to determine an average current consumption in this manner for a 24-hour period and then multiply by the number of days in 10 years. Further, to guarantee such a figure, it seems to me, is an extraordinary idea.

The average household refrigerator uses an increasing amount of current with each year of use. The size of this increase depends largely upon the type of insulation used. In some cases the increase is small while in other cases the consumption of electricity may be doubled in a few years time.

In view of this I am curious to know how the Federal Emergency Administration of Public Works plans to check up on the performance of the refrigerators it is purchasing. The specifications state that the government has the privilege of selecting from four to six refrigerators from stock for tests to be made. "If the kwh. consumption as determined in these tests exceeds the guaranteed kwh. consumption as given in the bid," the specifications read, "the contractor shall be liable for the difference in dollars between the guarantee and the actual kwh. consumption shown on these tests, evaluated over a 10-year period at the rate of 1 cent per kwh."

This guarantee is pointless if the government makes these tests when the refrigerators are new. For it is entirely possible for refrigerator "A," when new, to be somewhat more efficient than refrigerator "B," although after 10 years refrigerator "A" may be far less efficient than refrigerator "B." This possibility is eliminated if the government plans to test several of the refrigerators after some years of use.

Doubtless, the government has taken this into consideration since its method of asking for bids indicates its desire to obtain efficient and economical refrigerators. But I should like to know, out of curiosity, just how the matter is to be handled. Can you throw any further light on the subject?

HARVEY LINDSAY,

President

Answer: We were also puzzled by the Government's method of checking up on the operating cost for 10 years. Will somebody in Washington or Westinghouse explain the merits of the method?

Valuable Data in The Specifications Book

Servicio General de Refrigeracion
Expertos en Refrigeracion Electrica Automatica

San Jose No. 97, Habana

Nov. 7, 1936.

Dear Sirs:

We are very glad to acknowledge receipt to 1936 REFRIGERATION AND AIR CONDITIONING SPECIFICATIONS.

We have found that this book has very valuable information for the men who are in our business of service and sales of refrigeration parts and accessories, as this book places us in position to find the information desired such as: models, makes, etc. of any year needed.

We thank you for your courtesy in publishing our letter as you did in your Oct. 28 number and the footnote which you are bringing to the attention of the manufacturers.

A. ALVAREZ, Manager.

Advances in Quick Freezing During the Past Four Years

By Gardner Poole, Director of Research, The Birdseye Laboratories, Boston, and M. T. Zarotschneff, Technical Director, American "Z" Corp., New York City

At the Vth International Congress of Refrigeration at Buenos Aires in 1932, several papers were presented describing in detail many aspects of the then rapidly growing infant industry—the quick-freezing of perishable foods.

At that time fish and meat products were regularly quick-frozen in relatively large quantities while quick-frozen vegetables and fruits were just being introduced. The intervening period has been fruitful of ever-increasing public acceptance of packaged, quick-frozen products, especially vegetables and fruits.

In 1932, the detailed scientific knowledge underlying the successful preparation of these products for freezing was known to only a few people. However, during the past four years federal, state and private institutions all over the world have added much to the public's knowledge of the practical side of the subject.

Growth of the quick-freezing industry during this period can, in large measure, be said to have been dependent on:

1. Continued scientific and technological contribution;
2. Increasing public acceptance;
3. Engineering progress in the development of economical mobile freezing equipment;
4. The maximum utilization of existing facilities for storing, transporting, and otherwise distributing the products which obviated the necessity of large investments in special fixed equipment for these purposes.

Scientific & Technological Contributions

Control of Enzymes

Donald K. Tressler and associates were among the first to realize the necessity for the control of enzymes by blanching vegetables, and sugaring fruits in ways hitherto not used commercially in the preparation of food products. Methods of preparation have been published by H. C. Diehl and associates of the United States Department of Agriculture.

Because of all this work, the frozen vegetable industry now is rapidly growing in many parts of the United States simultaneously. The objective of the work of above investigators was the determination of just the right amount of pre-treatment necessary.

Thus, shorter blanching periods have been substituted for the longer blanching periods generally used in canning vegetables, resulting in a superior quality frozen products of a color, flavor and texture not unlike that of the original fresh vegetable.

M. A. Joslyn has added much to our knowledge of the proper methods of pretreating fruits for freezing by pointing out the part played by sugar in the inhibition of enzyme oxidation in fruits and in the preservation of flavor.

Bactericidal Effects of Freezing

Early work with respect to meat and fish indicated that frozen products held at low temperatures caused a gradual diminution of numbers of

bacteria until a low point was reached and thereafter counts would fluctuate within a comparatively narrow range. But only a limited amount of work was done on the bacteriology of frozen vegetables and fruits prior to 1932.

In that year, R. P. Straka and L. H. James published a report which indicated that vegetables inoculated with heavy doses of both A and B strain of clostridium botulinum did not produce toxin under the conditions used for the handling of frozen foods.

The fact that under special conditions toxins were produced, such as under the anaerobic conditions in unsterilized cans, started a number of investigators studying the possibilities of danger in frozen vegetables.

S. C. Prescott and L. P. Geer after exhaustive experimentation found that it was practically impossible for Botulism to occur through the use of frozen vegetables because, in all cases, the material was considerably decomposed and would be beyond the state of edibility for even the least fastidious of humans.

Later, after a thorough examination of the literature, James made the following statement: "Cl. botulinum—can grow in a mass of decomposing fruit or vegetable material. While it has been shown that this organism can produce toxin in spoiling defrosted peas, it is gratifying that similar containers of peas stored in an ice refrigerator for an equal period of time showed no toxin development. "It is significant, also, that whenever toxic containers were found, the contents were so badly decomposed as to ordinarily be considered wholly inedible, so that the public should have no fear of using frozen foods so long as they are entirely utilized soon after defrosting."

J. A. Berry, G. I. Wallace, S. E. Park and others confirmed the above findings. Similarly a clean bill of health accorded frozen vegetables and fruits by competent investigators has given encouragement to the pioneers of this new industry and to the public in accepting frozen products.

In general, it appears that in the case of vegetables and fruits there is a radical drop in numbers of bacteria immediately after freezing with gradual further diminution during storage, and that this diminution is more rapid in acid than in neutral or slightly alkaline products.

The Preservative Effect of Freezing

Earlier work had shown that slow freezing of cold-pack strawberries with sugar allowed sufficient time for fermentation and putrefaction to produce an inferior product. T. W. Heitz and T. L. Swenson showed that similar effects occurred in the slow freezing of ducks and poultry.

The bacterial count was from five to fifteen hundred times greater in the slow-frozen ducks compared with similar quick-frozen ducks. Similarly, the fatty acids of the slow-frozen product were twice as great. They also rated the slow-frozen ducks only two-thirds as appetizing as the quick-frozen.

The preservative effect of freezing

from the above bactericidal viewpoint is but incidental; its real value lies in its chemical and physical effects on the tissue.

Perhaps the most important effect of refrigeration or the chemical (autolytic) balance of a product is the slowing down of enzyme action according to the law of mass action which states that the velocity constant of a reaction is related to the fundamental properties of the reacting molecules and proportional to the temperature.

Roughly, a lowering of 10% in terms of absolute temperature will lessen the enzyme activity also 10%. This was brought out very noticeably in early experiments at the Birdseye Laboratories which showed that vegetables to be stored at -28.9°C . (-20°F .) did not need to be blanched so long as those to be stored at -17.8°C . (0°F .)

Investigators prior to 1932 in general did not take cognizance of this relation. Many of the published statements of government laboratories recommended storage temperatures of -9.4°C . (15°F .) and above. Recently there has come about practically a unanimity of opinion and nearly all investigators are now recommending storage temperatures around -17.8°C . (0°F .) or lower.

In addition to the decreased rate of autolysis at lower temperatures illustrated above by the decreased rancidity of duck fat found by Heitz and Swenson, the lower temperatures also decrease the rate of evaporation and indirectly desiccation, by decreasing the differential in vapor pressure, between the ice in the product and the moisture in the air of the cold storage room.

An example of this additional preservative effect is indicated by Tressler and C. F. Evers in connection with their test of wrapping materials at the Birdseye Laboratories. Testing two materials at 21.1°C . (70°F .) and -14.5°C . (5.9°F .), they found the rates of transmission of moisture vapor at the lower temperature to be $\frac{1}{10}$ and $\frac{1}{4}$ respectively of the rates at the higher temperature.

Of course, the difference of the effect was undoubtedly caused by unequal physical changes in the wrapping material. However, the general tendency toward less desiccation at lower temperatures is unmistakable and follows the rule that the rate of vaporization is directly proportional to the rate of change of temperature according to the Clapeyron-Clausius equation.

In other words, the heat of vaporization must be supplied to create evaporation regardless of the temperature. (Incidentally, the paper by Tressler and Evers referred to describes a workable method of determining the comparative resistance of papers and boards to passage of moisture-vapor.)

Increased Tenderness of Meats

The researches of R. Plank and others indicated a minimum of cell disruption in quick-frozen flesh products. From a practical viewpoint there is a possibility of obtaining any desirable degree of balance between the breakdown and loss of juices caused by poor slow freezing compared with the natural state of the unfrozen muscle tissue.

Granted that a certain piece of beef is tough yet juicy, it becomes a question of obtaining a maximum of tenderizing effect while retaining a maximum of juice. Tressler and Murray have shown that quick freezing, while retaining a maximum of juice, produces a tenderizing effect of about 20%. This is highly important in the light of providing a greater demand for the slightly tougher grades of meats.

In the case of fish, which cannot be classed with certain cuts of meat as to toughness, the opposite effect is usually noticed—a slight toughening due to coagulation of proteins.

In the case of meat, however, the tenderizing effect of cell breakdown offsets the toughening effect of coagulation by a considerable amount in either case. The toughening via coagulation is relatively unimportant as further coagulation occurs in cooking, as is well known.

Effect of Freezing on Vitamins

C. R. Fellers and P. D. Isham summarize the situation on vitamins as follows: "Storage probably has a marked destructive effect on some of the vitamins, especially C and B. For example, we have found that fresh peas shipped to Amherst from Bridgeport, N. J., or Albion, N. Y., lost 51% of their original vitamin C content."

"When these same peas were canned, the vitamin C loss averaged 84%. Asparagus, rhubarb and spinach all showed substantial losses in vitamin C content during shipment and storage. Spinach and asparagus also showed very marked losses in vitamin C when canned."

"While, as yet, we have few data on the point, it seems likely that fresh vegetables likewise lose considerable vitamin B during shipment and storage."

Continuing with regard to the effect of freezing, the above authors state:

"So far as our studies at Massachusetts State College show, losses in nutrient value of spinach, asparagus and peas are negligible as a result of freezing. Small losses of soluble nitrogen, sugars and vitamin C occur during the blanching process, but once solidly frozen, losses—if any—are very slight."

More recently, a report dealing exclusively with vitamin C losses in freezing has been received by one of the present authors. Based on the change in ascorbic acid content as determined by King's variation of Tillman's titration with 2:6 dichlorophenol-indophenol, the authors state: "Fresh, raw peas, packed with ice, lost from 30 to 50% of their vitamin C content in express transit for a twenty to thirty-six hour period. Frozen, blanched peas lost from 35 to 65% of their vitamin C after cooking. Under the same conditions, canned peas lost 75 to 90%."

Guinea pig bio-assays showed the average protective levels of peas to be as follows:

| | |
|---|----------|
| Raw peas (as received in Amherst) | 2.9 gms. |
| Fresh peas (cooked) | 3.6 " |
| Frozen peas (cooked) | 4.6 " |
| Canned peas (heated) | 8.8 " |

Thus it is seen that quick-frozen peas as served contained at least 78% of the vitamin C value of fresh peas which have been held in ice for 20—36 hours between picking and cooking.

It appears that refrigeration near the freezing point is as vital to the retention of vitamin C as it is to the retention of sweetness. Thus, properly refrigerated California peas on the Boston market may have a vitamin C content at least equal to that of the non-refrigerated peas shipped into the same market by local growers in hot weather. Therefore, inhibition of enzyme action by means of refrigeration appears to furnish the answer to a very important question.

In general, then, the foregoing covers the recent work. However, considerable data has been amassed since 1932, adding to our general knowledge of this subject. M. S. Fine and his associates definitely showed that freezing had negligible effect on the vitamin C content of orange juice.

Fellers and associates showed that animals fed as little as 1.5 gram level of quick-frozen asparagus showed better weight gains than the guinea pigs fed the same amounts of presumably fresh asparagus. Zilva, Kidd and West found that Bramley's seedling apples lose vitamin C at -5°C . (23.0°F .), -10°C . (14.0°F .), a little at -15°C . (5.0°F .) but none at -20°C . (-4.0°F .)

The investigations would indicate that there is only a minimum loss of vitamin C potency noted in quick-frozen vegetable products and that these products test up very favorably when compared with similar products in the ordinary fresh state (unfrozen) distributed under ordinary market conditions.

This is particularly noticeable in a comparison of vegetables shipped from remote points when five or six days elapse from the time of harvest until these products reach consuming markets.

Thus, the advantage in the application of quick freezing to these products comes from the fact that it is

possible to set up this mobile freezing equipment at the source of production and thus harvest, process and freeze these products within time limits that make it possible to preserve the originality of the products before any chemical changes have taken place such as, for instance, the change from sugar to starch in peas.

Investigations, therefore, by Tressler and others indicate that: "... while proper blanching of peas causes only very slight losses of vitamin C, prompt quick freezing is essential in order to prevent serious losses. Further, it has been shown that proper blanching is necessary to prevent losses of vitamin C during cold storage."

"Underblanched peas were found to lose their vitamin C relatively rapidly during cold storage, and overblanching caused serious losses of this vitamin, probably because of the solvent action of hot water. Evidently peas contain enzymes which, if they are not inactivated by blanching, cause a steady loss of this vitamin during cold storage."

These investigations show, further, that it is necessary to cook peas (and other of these quick-frozen vegetables) without thawing in order to retain the full vitamin C value. As in the case of fresh vegetables, there is a gradual loss of this vitamin if the vegetable is permitted to stand for some hours after thawing.

Fellers and M. J. Mack also showed that at least under certain conditions frozen strawberries could be put into manufacturing processes, such as in the making of ice-cream, without measurable loss of vitamin C. Leach Ascham states:

"Milk frozen by the quick-freezing method and tested after being stored for four months and two years respectively shows no significant lowering of vitamin A or vitamin C content over that found in fresh milk from the same source."

Professor W. V. Price of the Wisconsin College of Agriculture states: "Quick freezing preserves the quality of natural cheese, and holding the cheese in frozen storage delays spoilage in the package due to mold growth, leakage of fat or change in quality."

He states, further, in the same article: "Slow freezing caused defect in body, texture, and color which could be easily detected after defrosting." The words of Professor Price should be of particular significance to European cheese-producing countries.

Public Acceptance

The production of quick-frozen vegetables on a commercial basis and their acceptance by the public has opened up channels of distribution for a complete family of quick-frozen food products on a basis that was even beyond conception of the early pioneers in this industry.

This acceptance has brought about the development of special handling methods which were only justified when a complete line of fish, meats, poultry, vegetables and fruits was made available and not possible when the commercial application of the products comes from the fact that it is

(Continued on Page 12, Column 1)

If They Only Knew —

If you wanted to travel from New York to Chicago you wouldn't hire a horse and buggy.

Of course not—you would hop a plane or take the Century—provided—you knew that these modern methods of travel existed.

But thousands of beer dispensers are struggling along with horse and buggy methods of cooling and serving beer because they do not know of Temprite.

There are also those who may have heard of Temprite but who cannot believe that the many advantages offered by Temprite are actually possible.

The answer to both is the new self-contained portable demonstrator which will serve beer in any tavern owner's premises and dramatically prove its claim to supremacy. It will double your beer cooler sales. Write for particulars.



TEMPRITE PRODUCTS CORPORATION
1349 EAST MILWAUKEE AVE. - DETROIT, MICHIGAN
ORIGINATORS OF INSTANTANEOUS LIQUID COOLING DEVICES

BRIDGEPORT

Knows

BELLOWS

For an exacting interpretation of your bellows requirements, Bridgeport is in a position to offer you a unique service.

Their highly-trained staff of specialists in bellows manufacture and application, is prepared to cooperate with your engineers, to determine the most successful bellows design and application to serve your particular requirements.

Their complete control over each phase of manufacture... by exacting analysis and control of the alloys from the induction furnace to the finished seamless bellows... their individual inspection to rigid standards of quality and performance... insures close adherence to your requirements as to dimensional limits and physical characteristics.

Write for Bulletin KR. Bridgeport Thermostat Co., Inc., Bridgeport, Conn.



Engineering Progress in Quick-Freezing; Description of Two Systems in Use

(Continued from Page 11, Column 5)
cess was confined to but one product—fish.

Economies Introduced in Recent Years

The newer mobile type of freezing machine has contributed much toward economy in freezing as well as saving in investment for fixed equipment at sources of production.

Further economies in connection with the distribution of these products, both at retail and wholesale, have made possible the delivery to the consumer of a product guaranteed to give satisfaction and at a price competitively in line with either fresh or canned products. Improved blanching procedures have allowed storage at slightly higher temperatures and have enabled greater utilization of available types of refrigerated transport.

The distribution of these products at wholesale, in larger units and less costly containers, to hotels, restaurants, railroad dining cars and institutions provides an excellent outlet for peak production loads while the retail distribution is being more leisurely and carefully extended.

This industry has now reached a proportion, from the standpoint of volume, which permits of more rapid expansion of the distributing facilities—both retail and wholesale. Public recognition is given to the many economies and other advantages in the purchase of these products, especially in consideration of the factors of convenience and in the elimination of wastes.

The convenience factor, of course, surrounds the well-known principle of the packed product now universally recognized in the distribution of both perishables and non-perishables. That there are real advantages as regards elimination of waste is readily illustrated by studying the accompanying table.

Survey of Engineering Data Marking Quick-Freezing Progress

Economies Over Slow-Freezing

Much has been written concerning the relative economies of slow and quick freezing. Many investigators have been slow to recognize the value and importance of quick freezing. It is significant, however, to note that this industry has persistently advanced and expanded and has reached a stage of development that justifies its existence and its classification as a "new industry."

Probably much of the early skepticism was due to a misunderstanding regarding the application and use of extremely low temperatures; it was apparently not understood that these extremely low temperatures are used simply to pass these products through the zone of maximum crystal formation rapidly enough to obtain a temperature of -17.8°C . (0°F .) within the

product, thus producing only microscopic crystal formation.

No doubt this misunderstanding has been brought about by the emphasis which has been placed on the extremely low temperatures of the refrigerating mediums. There has been no differentiation between conduction and convection freezing—which is the answer to such skepticism.

It must be understood that the use of these temperatures is made necessary to secure a quality frozen product which will maintain its original goodness and characteristics and one that can be produced on a commercially efficient basis.

Quick freezing, or conduction freezing as perhaps it should be more properly called, has moved forward to become an important phase in the development and application of refrigeration in the preservation of a broad range of perishable foods. It represents a refinement through the introduction of methods and systems of a more modern type of design for conduction freezing.

It is now receiving recognition on this basis which will carry it forward rapidly and assure its universal application commercially in a field where the older and less modern systems cannot compete.

The successful commercial development of this new industry perhaps requires a much broader interpretation of quick freezing. Satisfactory development is possible only when quick freezing is dealt with as a complete system of getting perishable foods, with inedible waste eliminated at the point of production, from the producer to the consumer in a uniformly excellent condition by means of low temperatures constantly applied.

The chain of steps leading from producer to consumer involves many intricate problems connected with the raw material—pre-freezing treatment—mechanical handling—packaging—freezing—storage—transportation—marketing, and even preparation for the table.

Quick freezing will not make a good product from inferior raw material but it must be borne in mind constantly that mere excellence of raw material is not sufficient to insure a first-class frozen product.

Constant study and research is necessary in the selection of the raw product best adapted for successful freezing and storing processes and these detailed studies must be made if unfortunate results are to be avoided.

As early as 1907 the comparative effects upon the product of ordinary sharp freezing and of very much more rapid freezing by convection were noted by W. D. Richardson and E. Scherubel; while a much more comprehensive study along these lines was completed by Plank and others in 1916.

Since that time, our chemical and biological knowledge of the effects of rapid freezing has advanced to a point where we can now understand its benefits, and the term "quick freezing" has come to be applied to this accelerated freezing process.

Considerable research work has been carried on in determining the percentage-temperature curve of crystallization in freezing food products. As shown in the accompanying Fig. 1, Plank has found that between the temperatures of -0.6°C to -0.39°C . (31°F to 25°F .) approximately 75% of the total water content is frozen out and has therefore determined this temperature range as the "zone of maximum crystal formation."

Further tests have shown that if products are damaged during freezing, trouble occurs principally in this zone; consequently the objective of any quick-freezing system must be to pass the product through this temperature range so fast that only a minimum of physical and chemical changes occurs.

From a commercial standpoint, therefore, we must conclude that these favorable results can only be accomplished by conduction freezing through a method of application that is commercially and economically sound.

The Development of Mobile Freezing Equipment

The commercial application of the development of mobile freezing equipment has taken place within the past four years. The mobile nature of this equipment provides a flexibility that entirely eliminates the necessity for capital investment in fixed plant equipment on a permanent basis as well as facilities for relatively short seasonal operations.

It is simply necessary to secure suitable space in a plant such as a cannery or packing house (where water and electric power are available) for the temporary installation of this freezing machinery.

When the pack is completed at a given point, this equipment can be

Crystallization Curve in Freezing of Food Products

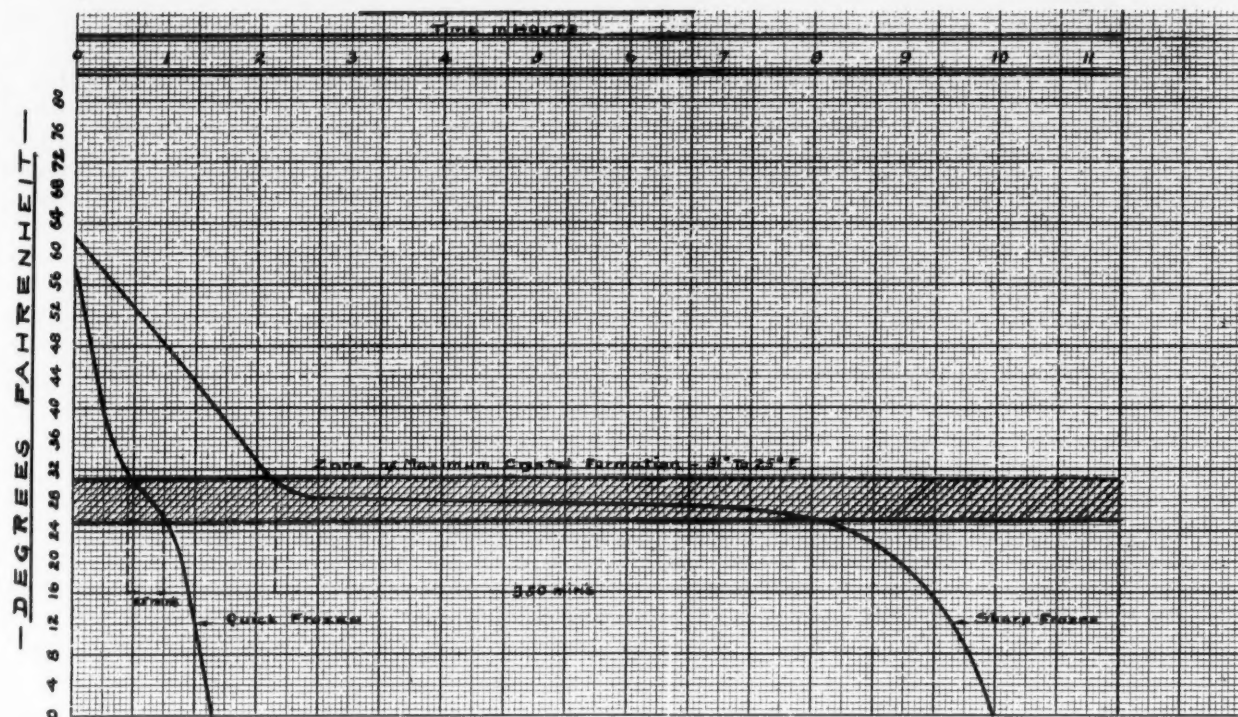


Fig. 1—R. Plank's percentage-temperature curve of crystallization in freezing food products. The range between 31°F . and 25°F . is the zone of maximum crystal formation, and it is the aim of quick-freezing to pass through this zone as quickly as possible, the comparative times for quick-freezing and sharp-freezing being shown.

transported by railroad car or motor truck to other points, thus following the crops and making possible the maximum use of the apparatus over the entire period of the year.

It is of interest to trace the itinerary of one of these frosters during the 1935-36 packing season. Having been duly reconditioned at Bridgeton, N. J.,—May 1, 1935, found it freezing strawberries at Norfolk, Va.,—June 5 it joined similar equipment at Bridgeton, N. J., to freeze peas during the two or three weeks that this high-quality crop lasted. June 25 found it at Albion, N. Y., again freezing peas until the end of July.

While similar frosters were being moved from Albion to Mount Morris, N. Y., for freezing corn-on-the-cob, this particular machine was returned to Bridgeton, N. J., where it froze lima beans from Aug. 1 to Oct. 10.

A few days later it was freezing spinach from the fall crop at this same point, continuing on this product for three or four weeks. Dec. 15 found it freezing peas at Harlingen, Tex. (2,300 miles away). On Jan. 15, 1936, the broccoli and spinach at Harlingen were ready to keep the froster operating well into February.

After a complete overhauling, it was shipped to Norfolk, Va., to await the 1936 strawberry pack, beginning May 1. Thus, this particular machine had traveled over 6,000 miles, had operated for over 200 days and had frozen over 750,000 lbs. of produce.

Moreover, this froster had performed five or six different tours of duty at locations where investment in permanent installation would not be justified.

Description of the Two Most Important Present-Day Quick-Freezing Systems

Both the "Z" Brine Spray and the Birdseye Multi Plate Froster have been described numerous times in literature. Both have mobile features but, thus far, the "Z" process has been used mainly on a permanent basis at plants requiring almost continuous operation during the year; while the rapid expansion of the Birdseye process in the field of frozen vegetable and fruit products has made necessary the greater use commercially of the mobile feature of this equipment.

However, perhaps a brief description of each of these processes may be of interest.

The Birdseye System

This process consists of freezing packaged products under controlled pressure between two refrigerated flat metal surfaces, such as belts or plates.

The belt-type of equipment is used where permanent installations are necessary although, to a large extent, this belt-type machine is being replaced by the plate-type froster which is more economically operated through the use of aluminum plates under easily controlled pressure, so that the same product is actually frozen at 20°F higher temperature in even shorter time than with belts of relatively poor conductivity, such as Monel or ferrous metal with which it is difficult to control pressure against the product.

As its name implies, the Multi Plate Froster consists of a series of refrigerated plates, arranged one above the other in such a manner that they may be moved apart to receive products between them and then closed with any desired degree of evenly distributed pressure.

Normally, they are held apart with an opening between them somewhat

greater than the thickness of the package to be frozen and are raised and lowered by means of a hydraulic piston connected to the lower plate. These plates are made of rolled aluminum alloy with sinuous passages through which is circulated the refrigerant—which may be brine, ammonia or other type.

These passages are flexibly connected at one end of each plate to a header feeding all the plates with the refrigerant; while the passages at the other end of the plates are flexibly connected to a header which carries the gas to a surge drum located on top of the froster.

This surge drum also acts as a receiver for the liquid refrigerant and both headers are connected to it.

The plates and connections are enclosed in an insulated box or cabinet with regular freezer doors on all four sides, thus making possible the operation of the equipment at ordinary room temperature.

On the frame base, under the cabinet, is located the compressor, condenser motor, condenser, hydraulic lift cylinder, hydraulic oil tank and pressure pump direct connected to a $\frac{1}{2}$ -hp. motor.

In operation the plates are cooled until they begin to frost up and then the product to be frozen is loaded between the plates.

The non-freeze oil is then pumped into the hydraulic cylinder and the first plate, with its load, is raised until it picks up the second plate with its load, continuing in this manner until all the plates with their loads are raised, thus providing contact on both sides of the package under predetermined pressure and resulting in maximum freezing contact.

The cabinet is then closed and the product left in the froster until its temperature reaches about -17.8°C . (0°F .). The relative freezing times for all products of various thicknesses have been determined by thermo couple tests.

The Birdseye Multi Plate Froster used as mobile equipment is usually of the 6-station, self-contained type.

It is significant to note that, in comparison with the older belt-type froster, the present Multi Plate type has about the same capacity but requires an area of only $38\frac{1}{2}$ square feet of floor space as against 488 square feet for the belt-type.

In other words, Multi Plate Frosters installed to cover the same space occupied by one 50-foot Belt-Type Froster would increase the freezing capacity for a given floor space from 1,000 to 7,440 pounds an hour.

The "Z" Process

While in outward appearance the "Z" Process equipment differs considerably from the Birdseye system, they actually have inherent points of similarity.

In the Birdseye equipment, refrigerant is brought in intimate contact with the product through the means of a metal; while in the "Z" Process, the refrigerating effect is conveyed through the means of finely atomized salt brine.

Since the time of presentation of several papers dealing with the "Z" Process at the International Congress of Refrigeration at Buenos Aires, the freezing equipment has become fairly standardized and is now available in three types:

1. Cabinet type;
2. Conveyor type;
3. Truck type.

The cabinet-type, as its name implies, consists of an insulated cabinet with one or more compartments where product is placed on perforated trays.

This particular cabinet has five compartments, each provided with five trays; the capacity of each tray is 25 to 30 pounds which, with an average freezing time of less than one hour for average size fish, gives an hourly capacity for a five-compartment cabinet of some 625 pounds. This plant is operating most of the time on a 24-hour basis, thereby producing some 15,000 pounds of quick-frozen fish every 24 hours.

It is of interest to note that the floor space occupied by the plant is but 10% of the space required by the ordinary sharp-freezer operating at -23.9°C . (-20°F .) and having the same output every 24 hours.

The conveyor-type of freezer consists of an insulated tunnel through which product is carried on a wire mesh belt. This particular type of equipment is especially suitable for handling uniform product whose freezing period is relatively short.

Therefore, it is suitable for quick-

(Continued on Page 13, Column 1)

Waste Elimination Chart

| Vegetables | |
|--------------------------|--------------------|
| Products | % Waste Eliminated |
| Asparagus | 65 |
| Lima Beans | 56 |
| Brussels Sprouts | 50 |
| Broccoli | 53 |
| Peas | 66 |
| Spinach | 48 |
| Seafoods | |
| Product | % Waste Eliminated |
| Fillet of Haddock | 66 |
| Fillet of Cod | 66 |
| Fillet of Mackerel | 50 |
| Fillet of Sole | 75 |
| Cooked Lobster Meat | 80 |
| Cooked Crab Meat | 80 |
| Poultry | |
| Product | % Waste Eliminated |
| Broilers | 33 |
| Fryers | 33 |
| Roasters | 25 |
| Duckling | 30 |
| Turkey | 25 |
| Meats | |
| Product | % Waste Eliminated |
| Boneless Sirloin Roast | 40 |
| Boneless Rib Roast | 40 |
| Boned Lamb Fore Roast | 33 |
| 3/4 Boned Lamb Leg Roast | 25 |
| Stewing Lamb | 44 |
| Pork Loin Roast | 17 |
| Steaks | 15-25 |
| Fruits | |
| Product | % Waste Eliminated |
| Blueberries | |
| Raspberries | |
| Strawberries | |
| Sliced Peaches | |
| Youngberries | |

(Inasmuch as these fruits are carefully selected and packed at the time when they are perfectly ripened, there is no waste or spoilage to add to the cost.)

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(Continued from Page 12, Column 5)

freezing loose shrimp which requires but 10 minutes for complete solidification; likewise, it is practical for handling fish fillets put up in transparent cellulose bags (with freezing period of only 15 to 20 minutes), or for any large-scale production such as chickens which usually require one hour for complete freezing.

The truck-type of freezer combines some of the best features of the two preceding types. As its name implies, this freezer consists of a chamber into which an entire truck loaded with product is placed at a single time.

This type offers considerable labor saving as the product may be handled right at the packing table and then the entire load trucked, without re-handling, to the cold storage where the "Z" Quick Freezer is usually located.

The truck is composed of two parts; the upper being a cage with trays which are placed into the quick freezer, and the lower part being a skid platform which permits convenient handling but does not itself enter the freezer.

This particular plant for fish fillets in packages was originally built for handling 12,000 pounds every 24 hours, and in February, 1935, it was doubled to handle a total of 24,000 pounds per 24-hour period. There are two cabinets; each accommodating three trucks at a time.

The basic idea with the "Z" process is to replace air, which is a very bad heat conductor, with finely atomized brine which is an excellent heat conductor and which, in addition, has considerable velocity. In contrast to the "Z" Process with a sharp-freezer of the same capacity, the following economies are observed:

1. Only a fraction of the space is occupied, which means also a considerable reduction in insulating material;
2. Due to the use of brine instead of air, the surface of the refrigerating coils is reduced many times;
3. With the "Z" Process, the amount of brine in circulation is very small which permits very quick starting of the plant, usually but one or two hours instead of the several days needed to cool down a sharp-freezer;
4. In most of the operations, ordinary salt brine is used, with an average temperature of -19.4°C . (-3°F .) which means some 25 to 33% saving in power as contrasted with power required to obtain an air temperature of -28.9°C . (-20°F .)

During the past four years, intensive work was done on the study of the quick freezing of a variety of products. Some of the results may be summarized as follows:

1. **Fish and Seafoods:** besides improving the technique of handling round fish, several methods were worked out for handling packaged fish fillets and other products, which must be packaged before freezing.
2. **Meats:** it was found that pork products, such as hams and bellies, can be readily quick frozen by direct contact with brine sprays, and the laboratory analysis, as well as tests carried through the curing and smoke house, showed definitely that the product was absolutely unaffected.
3. **Poultry:** greatest progress was made in poultry, largely thanks to the

Birdseye Multi-Plate Froster

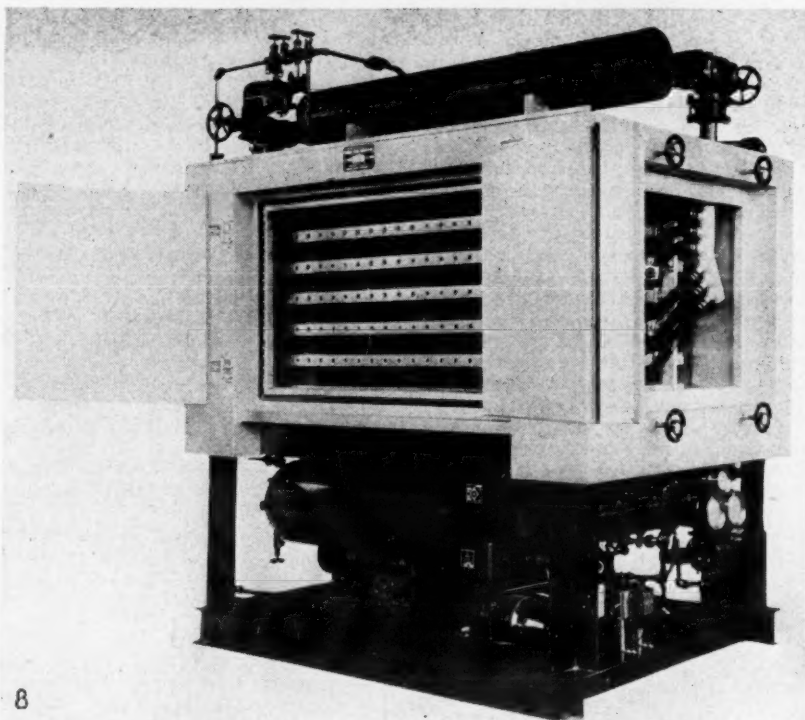


Fig. 2—The multi-plate froster consists of a series of refrigerated plates, arranged one above the other so that they may be moved apart to receive products to be frozen and then closed with any desired pressure.

cooperation of the United States Department of Agriculture. The value of quick freezing was proven in terms of lowered bacterial counts (thousand times less), reduced fat acidity, and improved palatability. Freezer burn on poultry, which may occur during sharp freezing, is avoided with the "Z" Process. The usual freezer shrinkage is also eliminated.

4. **Fruits and Vegetables:** two seasons were devoted to research work on these products and it was shown that a number of products can be quick frozen before packaging more economically and more rapidly. Thus corn-on-the-cob was solid after 15 to 20 minutes; strawberries were solid in less than 10 minutes, and sliced apples in 8 to 12 minutes, depending on the thickness of the slice.

It was found that for certain specified products the direct effect of brine is inconsequential, as such products can be quickly rinsed with clear water and packaged thereafter. In handling sliced apples, the usual brining could be combined with quick freezing; in handling sour cherries, best results are obtained by quick freezing by direct contact with brine spray in less than 10 minutes on a conveyor-type "Z" freezer, then quickly rinsed with clear water sprays and feeding directly into the standard cherry pitter.

The somewhat greater loss in pitting is offset by a greatly improved quality and decreased amount of juice pressed out on defrosting. Presently, the cherry pitter is being adjusted to handle frozen cherries.

Progress in Distribution

Chemical and physical problems arising during the transportation of these quick-frozen products are very similar to those encountered during storage.

Extreme care is provided in connection with the preparation, handling and processing of these quick-frozen food products at points of production to assure of their being preserved at the very height of their goodness; therefore, it is essential that suitable storage facilities be provided in moving the products from points of production to consuming markets.

In the early days of this industry some difficulties were encountered because of too high temperatures during transportation and distribution.

These problems have now been almost entirely overcome by the use of improved refrigerator cars for transportation and by providing improved mechanically cooled storage cases, capable of maintaining the desired temperatures, in the merchandising of these products.

Low-Temperature Storage

Few if any of the larger, well-located cities in the United States lack low-temperature refrigeration facilities.

Frozen meats, fish, poultry, eggs dairy products and ice cream are now held at low temperatures in the better storage warehouses of the country, thus providing for slower autolytic changes caused by enzymes and oxidation—a fact now generally recognized in successful cold storage practices.

Therefore, low-temperature storage is available at all distributing points for an ever-increasing volume of these quick-frozen products now being marketed.

Progress in Refrigerated Truck Development

The last four years have seen an improvement in the design and availability of refrigeration equipment suitable for low-temperature frozen foods trucks.

It might be said that, whereas in 1932 the building of trucks for -17.8°C . to -12.2°C . (0° to 10°F .) (other than conventional ice cream bodies) had a more or less experimental aspect, at the present time it would be considered an ordinary application of refrigeration based on proven figures.

Trucks of 360 cu. ft. capacity have been operated at temperatures of -17.8°C . to -6.7°C . (0° to 20°F .) by means of dry ice, and by means of mechanical systems using plates containing an eutectic brine. The brine is frozen by a condensing unit mounted on the truck frame but operated during idle periods from the garage electric power line.

Other systems are coming into common use for truck refrigeration at the low temperatures required for ice cream, and time will probably show their relative desirability in the refrigerated transport of frozen foods.

These systems include brine ice (eutectic ice and salt) giving a uniform temperature of -21°C . (-5.8°F .)—power take-off generators which supply a constant potential to a special compressor motor after a certain engine speed is reached—absorption systems charged at the plant—gas-engine operated compressors, and others.

The transport of frozen foods between the warehouse and retail store is being simplified by giving proper attention to carton insulation, dry-ice

refrigeration and mechanically cooled bodies.

The weight of insulation alone on a delivery truck carrying sufficient load to make refrigeration necessary on the last deliveries, is about one half the pay load. The service load caused by door openings on such a body held at low temperatures is high, being as much as the total leakage—and sometimes even more.

For this reason it seems logical that the large low-temperature bodies will be most suited to long-distance, inter-warehouse transfers where the bodies will carry large loads and not be subjected to frequent door openings.

Development of New Type of Low Temperature Cabinet

Since 1932, marked progress has been made in the design and construction of refrigerated dispensing cabinets for use in distributing these quick-frozen food products in the retail store. At that time, refrigerated display cabinets were used as it was believed that the actual display of these products was essential for successful merchandising.

The display-type, with a relatively large glass area, necessitated a design which resulted not only in a higher construction cost but also in a very much higher operating cost due largely to difficulty in maintaining proper temperatures in this glass section and in providing an adequate seal to withstand pressures and prevent excessive frosting of the glass.

This difficulty was overcome by providing for the design and construction of a non-display cabinet of an efficient type in a low-price range and one that could be operated at a minimum cost basis. This development called for an engineering study which made necessary the testing of various types of construction and various materials in order to find those best suited for the purpose.

As a result of this study, a new all-welded construction type of cabinet was adopted, using heavy gauge steel; with top of Polychrome (stainless steel backed with a heavy sheet of ordinary steel) and side and end panels of porcelain finish, thus providing a cabinet which will insure efficient operation and, at the same time, be pleasing in appearance.

The front of the cabinet contains a glass panel behind which are inserted attractive display cards, advertising the product to full advantage.

The packages of quick-frozen foods are stored in tall vertical lift drawers, constructed of aluminum, thus providing light weight, strong construction and high thermal conductivity.

A handle at the top permits these drawers to be easily lifted so as to make any package within the entire cabinet easily accessible. The hinged lids, although of extremely light construction, are heavily insulated in order to insure low temperature at the very top of the storage space.

The compressor assembly is of special design, maintained at one end and within the cabinet and requiring a space of only 10 inches out of the total length of the cabinet itself. It is operated by a $\frac{1}{4}$ -hp. motor, wired for

either AC or DC current, as may be required, and operated at 110 volts.

The dimensions of the cabinet, which has a capacity of approximately 450 pounds of packaged product, are:

| | Outside | Inside |
|--------|---------------------|---------------------|
| Length | 68" $\frac{1}{4}$ " | 48" $\frac{1}{2}$ " |
| Height | 33" $\frac{1}{4}$ " | 27" $\frac{1}{2}$ " |
| Width | 29" $\frac{1}{2}$ " | 18" $\frac{3}{4}$ " |

The cabinet is entirely portable and self-contained, is on casters and can be plugged into any standard receptacle.

Availability of Quick Frozen Products

In 1932, the distribution of quick-frozen products, with the exception of fish, was largely limited to retail outlets. Within the past four years, however, marked progress has been made in broadening the channels of distribution to include both retail and wholesale outlets.

While at the present time, retail distribution is limited to concentrated areas—largely in the eastern part of the United States; on the other hand, wholesale distribution has now been established through representative jobbers in the most important trade centers throughout the country.

Quick-frozen foods in packaged form, with all inedible portions removed, and ready for cooking or consumption, have been of particular advantage in serving the wholesale or institutional trade.

The preparation of these foods does not require so much help or so much space and, when held under proper temperature conditions, these foods provide a stability that solves the problem arising from uncertainties as to weather conditions or other factors affecting patronage where only a minimum is served and a maximum had been provided for.

In other words, the carrying of a stock of these foods under refrigeration insures a flexibility that makes possible the serving of 2,500 portions or 500 portions, as the case might be, without loss or waste.

To provide for this increased demand and in order that distribution may be efficiently and economically handled with a minimum cost from the standpoint of transportation and storage, production facilities have been established in nearly all geographical sections of the country where these products are available.

Now that these foods are available, most of the hotels and other public eating places of this character have installed or are in the process of installing adequate refrigeration facilities for holding stocks of these quick-frozen foods—which include a full line of meats, fish, poultry, vegetables, and fruits.

In the larger places, these facilities are in the nature of refrigerated rooms; while in the smaller restaurant and in dining cars, low-temperature cabinets are provided of a capacity sufficient for holding quick-frozen foods and ice cream to provide for maximum demand.

Starting in a modest way in 1932, this wholesale distribution of quick-frozen foods has quite rapidly and consistently expanded and substantial yearly increases in volume of sales is the best barometer to indicate the successful trend of this industry.

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Air Conditioning

Merle Discusses Factors to Be Considered in Figuring a Store Air-Conditioning Installation

By Andre Merle, Air Conditioning Consultant, New York City

AIR CONDITIONING for comfort promotes both health and profit—and store owners throughout the nation are becoming increasingly aware of this fact. Today, it is not so much a question of when or why air condition, but rather, what type of system should the dealer install? How much does one cost to own and operate?

The average store owner, in most cases, is guided by what his architect, contractor, or the manufacturer of air-conditioning equipment recommends.

When it is considered that the average person breathes about 35 lbs. of air every 24 hours, and consumes only about 7 lbs. of food and water during the same period, this question of air conditioning becomes a much more important item.

The Fundamentals of Air Conditioning

To qualify as "complete air conditioning," a system must embody five fundamentals:

1. Temperature control. The air must not be too warm or too cold.
2. Humidity control. The air must not be too wet or too dry.
3. Air motion. The air must circulate evenly throughout the store, without drafts or chill spots.
4. Filtration. The air must be clean, fresh, and pure.

5. Noise prevention. Air units, refrigerating machinery, and air distributing ducts must be soundproofed. A noisy conditioning system, for many merchants, may be worse than no system at all.

Another requirement of air conditioning is the mixing of air. The reason for this is economy. For example, suppose we condition 100 cu. ft. of air to 50° F., then mix 100 cu. ft. of 80° F. air with it. We now have a total of 200 cu. ft. of air at approximately 65° F. This gives us a spread of 15° F., normally satisfactory for comfort conditioning.

It is less expensive to heat a mixture of part cold air with store air during winter than it is to heat all cold outside air. The opposite is true during the summer, with a mixture of store air and warm outside air.

Under any condition, a portion of fresh outside air should be used. In actual practice, from 20 to 40% of the air circulated should be fresh outside air. The fresh air introduced

helps to build up a slight positive air pressure within the store, enabling the store owner to keep his door open in summer, if he wishes.

A little heat or dust may be allowed to enter under this arrangement, but it will not be enough to upset operation of the system, or unbalance indoor conditions.

Great strides have been made in comfort cooling for health and efficiency. Conditioning apparatus of the future will in all probability include some sort of "synthetic climate." Circulated air will be filtered of all dust, soot, hay fever pollen, smoke, and bacteria. Certain electrical, chemical, and gaseous substances may be injected into the air, conducive to health, comfort, and efficiency.

Perhaps tests now being conducted will call for the addition of certain substances to our present atmosphere—in fact, an artificial climate may, in time, be created. Congested areas, whose atmospheres have been polluted by the refuse of industry, will in all probability demand an artificial climate within a few years. Hospitals have for a long time been experimenting with air conditioning as applied to certain pulmonary and respiratory ailments, especially hay fever. Results to date have been most gratifying.

Considerations of Types of Systems

After the store owner has decided on air conditioning, he begins to consider the type of system he wants to install, and the location and position of the conditioners. In a duct system, the size and appearance of the air outlets will come up for attention; if units are used, the same considerations will apply.

The merchant understands that, the more complicated the system, the longer it will take to install. An average size store may be conditioned in a week. The mechanical part of the system, if it is located in the basement, may take longer to install, but it will not inconvenience the store's customers.

It is rather difficult to lay out any definite rules as to when unit and when central station systems should be recommended, but, in general, a store with from 20,000 to 30,000 sq. ft. of floor area (that is, a store about 100x250 ft.) is about the limit in which a unit system may be used to best advantage.

Of course, it is not necessary to have a whole flock of refrigerating compressors, or even one, in an air-conditioning system. All that is actually required is a cooling medium. Cold water will often accomplish the desired results, if a sufficient supply, at 50 or 55° F., is available.

The latter system, however, is in most cases not as satisfactory as a positive mechanical system, using Freon-12 or some other refrigerant. It is always better, also, for the system to include more than one compressor, so that the equipment may be operated on partial loads.

Outdoor conditions are not always the same; load conditions inside, too, may vary considerably from time to time. When this occurs, the equipment should be such that the merchant may cut down or increase its use for the most efficient and economical operation of the system.

Non-Mechanical Conditioning Methods

In addition to the positive mechanical system just described, two other systems are also applicable to stores. One is the water-vapor method, the other the steam-ejector system. The

first chills the cooling water directly, and the other by means of a vacuum produced by steam passing through air and ejected at high velocity. These systems, as a general rule, are not very economical for smaller stores, although steam-ejector systems have often been used with success in relatively small restaurants and hotels, where there was an abundance of steam, and where operating cost was not the chief factor to consider.

An air-conditioning system is much the same as an automobile—without the proper automatic and convenient devices, neither would have come as far as it has. And this brings us to a consideration of the use of controls in a store's air-conditioning system.

Most store owners prefer a fully automatic system, one that stops and starts in accord with thermostats and other pressure-regulated devices. They have no objection to pushing a switch when they enter the store in the morning and again when they leave for the night. For the rest, however, they prefer not to be concerned.

It is a good idea, when dealing with a store owner regarding air conditioning, to quote him prices on a system that is semi-automatic in operation, as well as on one that is fully automatic. Some owners, being of a more or less mechanical turn of mind, may not mind regulating some features of the system manually when they find that such a plant will cost considerably less than one controlled entirely automatically.

Factors Affecting Size of Plant

In considering the matter of installation and operating costs, exact figures are of course not obtainable without a survey of the specific store in question.

One store may have more windows than another one of the same size. Or another store may be in a dark neighborhood, in which case the problem of heat from the additional lighting required would have to be considered. Or it may have two sides always exposed to the sun. All these factors influence the installation.

In order to condition a store most economically, the store owner should be induced to see that shades or awnings are used during the peak of the afternoon sun. Store lighting might also be inspected, to be sure that the lights used are giving the proper lighting; often, with revisions, fewer lights can be made to make the store brighter, at the same time cutting down the heat factor considerably.

Consideration of roofs is also of vital importance in estimating the cooling requirements. When the store under consideration is a one-story affair, the heat load will be lessened if the roof is painted a bright color. Remember, black absorbs the heat. Aluminum paint is far better.

Estimating Approximate Costs of Installation

As an approximate budget figure for an average store, using a reasonable amount of duct work or a unit system, estimate about \$1.75 per sq. ft. of floor area. That is, if the store is about 20x60 feet (about 1,200 sq. ft. of floor area) about \$2,100 would be required for the system proper.

Just to be on the safe side, however, it is perhaps better to figure the cost of the system at about \$2 a square foot, in quoting your figure to the merchant. This will usually cover any additional services which will be necessary, and which were overlooked in making the first estimate.

This \$2 estimate, however, will apply only to the average—and there are all sorts of variations which may raise the installation costs. A store with a 20-ft. ceiling costs more to condition than one with a ceiling of but 10 ft. Likewise, if the store has an extra large amount of window space, or more than the usual number of electric lights, the cost of conditioning will be increased. For a very small store, say 10x20 ft., the cost of conditioning is almost double, or about \$4 a square foot.

Figuring Operating Expense for Owner

Regarding operating cost, it is difficult to establish any exact figure, but it is safe to estimate that the

average air-conditioning system's operating cost for a summer season will be from 10 to 15% of the cost of the entire system. That is, if the original system cost \$2,000, you can figure from \$200 to \$300 for summer operation; or, expressed another way, about \$100 a month for the three months. Expressed in still a different way, a store can be completely air conditioned, operated, and amortized for from 50 to 85 cents per square foot of active conditioning area. If the store is relatively large, the price per square foot will decrease.

One system, for example, cost \$20,000 to install; another approximately twice the area was conditioned for less than a 50% increase in price.

Operating cost per square foot will vary with the period in which the merchant desires to amortize the job. If it is to be paid for in five years, the cost will be much more than if it is paid off over a 10-year period. Reliable information, however, places the amortization period at somewhere around five years.

Of course, the most expensive services of any air conditioning system are the electricity and water required for operation of the refrigerating compressor and the conditioner fan. In submitting operation cost figures, it is only necessary to estimate the number of hours the system will operate at maximum capacity, and the cost of the electricity and water rates often vary considerably, so exact figures should be obtained before the estimate is attempted.

Numerous installations in stores throughout the country indicate that the average load percentage is in the neighborhood of 60% for the summer season. Around New York City, for instance, the summer season is about 102 days. During this period the compressor will operate, say, six hours per day, or about 720 hours per season.

Guarantees Which Should Be Offered

There are three types of guarantees which should be included with any air-conditioning project. First of these is the performance guarantee, which assures the store owner that the system will produce and maintain the desired conditions of dry bulb and relative humidity.

This performance guarantee should state exactly the range that will be maintained inside when the outside is the maximum temperature during the summer, and the minimum temperature during the winter, as well as maximum and minimum relative humidities.

The second, or equipment guarantee, covers any mechanical failures in the system, such as from compressors, fans, motors, or controls. As a general rule, this will be for a year's period. If a summer conditioning system only is sold, and the fan equipment set up for year-round use, the fan gets a full year's trial—the rest of the equipment only about three months.

Last guarantee, and most important to the merchant, covers service. Most merchants demand, and have a right to expect, a year's (or a season's, in the case of summer conditioning equipment) service without cost.

And here is a warning to air-conditioning men—think twice before you make any wild or careless guarantees on performance. If you guarantee service as well, every time that something goes wrong—and it does at times, even in the best of systems—you'll have to go down and put the system back in operation.

U. S. Capitol to Have Complete Conditioning

WASHINGTON, D. C.—Complete air conditioning for the United States Capitol will be provided through a \$2,550,000 appropriation granted at the last session of Congress.

The new system, to be completed before Jan. 1, is said to be the largest central refrigeration plant ever attempted to serve a group of buildings, and will cost more than the original Capitol itself.

Over 1400 men are employed at present in installing the ducts.

The new equipment will condition nearly 2,000 rooms in the Capitol building, the old House, new House, and Senate office buildings. Previously only legislative chambers and press galleries have been air conditioned.

A temperature of 78° F. will be maintained, with 50% humidity. Each office, however, is being provided with a thermostat for individual regulation.

Whitney Increases Bending Brake Line

ROCKFORD, Ill.—Whitney Metal Tool Co. has added to its line of portable bending brake equipment a new combination model, similar in capacity and features to the company's "Air Conditioning Special" bending brake introduced last spring, but including fingers for box and pan bending.

The equipment is designed to assist in fabrication of ducts and other sheet metal work used in air-conditioning systems, warm air heating installations, and the like.

Construction of the combination tool is much the same as the plain bending model, except for changes in the arms supporting the upper jaw. These arms now have two alternating fulcrum points, so that the jaw can be raised and shifted back to accommodate the box fingers which are attached to the front edge. Set screws on support members may be adjusted for the gauge of metal being used.

There are also two alternative connections for the adjustable toggle links which actuate the upper jaw, and two sets of return springs, one for plain bending and the other for box bending. These springs lift the upper jaw out of the way automatically when the bend is completed.

Gar Wood Introduces New Package-Type Air-Duct System

DETROIT—Gar Wood Industries, Inc., is putting into production a new, redesigned, air-duct system for automatic home heating and air conditioning, reports Frank H. Dewey, manager of the air-conditioning division of the company.

Runouts from the trunk lines to the grilles of the new duct system are limited to four sizes, all a single depth to fit a standard 2-inch by 4-inch partition. These sizes are maintained for the entire run without change.

Use of a newly developed method of trunk design has enabled the company to reduce the number of stock parts required to one standard-sized panel for each depth, states Don J. Luty, chief engineer for the Gar Wood air-conditioning division.

The duct system provides for better balanced air distribution, the engineer claims. It also enables the dealer to sell the heating and air-conditioning equipment and ducts as a unit, completely installed and ready for use.

Mills Named Counsel For ACMA & RMA

WASHINGTON, D. C.—J. A. Mills, New York attorney, has accepted appointment as general counsel to Air Conditioning Manufacturers' Association and Refrigerating Machinery Association, according to recent announcement from local headquarters of these two national organizations.

Formerly assistant to the president of Carrier Corp., Mr. Mills is now associate general counsel for this concern.

Member of the New York bar, and of Phi Delta Phi, international honorary legal fraternity, Mr. Mills has had wide legal experience, particularly in the refrigerating and air-conditioning field.

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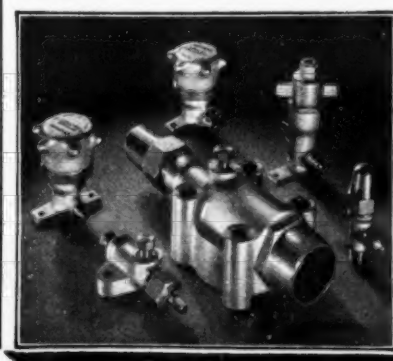
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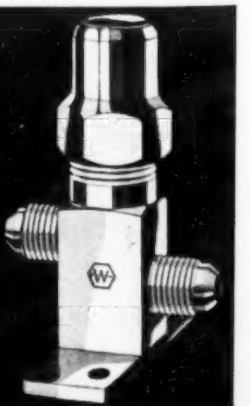


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Air Conditioning Made Easy

By F. O. JORDAN

Effects of Air and Moisture In Condensing System

SECTION NO. 6

The Complete Air Conditioning System For the Cooling Season

Air and Moisture—While air and moisture are quite acceptable in certain circles, they are nothing but a "pain in the neck" within any refrigerant system. Air within such a system uses up a portion of the volumetric capacity of the compressor, raises pressure drops, and retards heat transfer, within both the condenser and the evaporator, all of which combine to reduce capacity and at the same time increase power consumption.

The physical properties of a mixture of air and refrigerant being different from the properties of the refrigerant alone, the relationship between temperature and pressure is changed to the extent that work of testing, setting of expansion valves, etc., is seriously impeded. In fact, tests which are run with air in the system are only a waste of time.

Moisture in the System

The effect of moisture in the system may be even worse. If the refrigerant is SO₂, the results are so immediate and disastrous that there will be no doubt in the mind of any bystander as to the undesirability of moisture in the system.

However, in the case of methyl chloride or F-12, the effects of moisture being somewhat milder, the mind may require a somewhat longer period to receive its impressions.

With the two latter refrigerants, quantities of moisture have somewhat the same effect as air with additional detrimental influences on refrigerant and oil, and with the very bad feature that such moisture frequently freezes up the expansion valve, or blocks off the portion of the coil immediately after the expansion valve.

When such freezing occurs, the effect upon performance is the same as when the valve is too small, or set too lean, or the same as when the refrigerant filter is plugged. Frequently, such freezing up will stop the flow of refrigerant completely.

Preventing Presence of Air

Prevention being better than cure, the obvious thing to do is to take every precaution to install the entire system so that there are no leaks and then keep it plugged air-tight and moisture-right at all times. All tubing or equipment which is to be used in connection with the refrigerant system must be kept plugged or capped, or tubing may be flattened at the ends so that it is air-tight.

After the system is completed, and before it is charged with refrigerant, it must be pumped down to a 25° vacuum by a pump or compressor, and all portions heated by a torch until thoroughly dried.

One common method of removing air from the system before it is charged with refrigerant, is to use the compressor to "pull" a high vacuum on the "low side" and allow the compressor to discharge to atmosphere. All of the air cannot be removed in this manner, however, due to the impossibility of producing a perfect vacuum.

Procedure with New System

Before any new system or any other system which has been opened to the atmosphere may be placed in oper-

ation, the following procedure insures that all air is removed:

(A) Admit sufficient refrigerant to the system to raise the pressure to 10 lbs. or more, and open to atmosphere the suction line at the compressor.

(B) Continue to feed refrigerant into the system. The gas resulting from the evaporated refrigerant will travel through the system, pushing most of the air before it. This action should be allowed to continue until only gas is escaping from the opened suction line at the compressor.

(C) After closing the suction line, operate the entire system for at least 10 minutes. After this period, close the liquid line service valve at the condenser, and pump the job down as low as possible without "slugging." Purge off the compressor at the highest point until certain that nothing but gaseous refrigerant is escaping.

(D) Check for presence of air by allowing a good flow of water through the condenser-receiver until the condenser gas pressure reaches equilibrium. If this pressure is higher than the saturation pressure for the refrigerant used, corresponding to the temperature of the water circulated through the condenser (See Table No. 16, in the Data Section), there is air in the system which must be removed.

Any system which is to be opened to the atmosphere must be opened only while at a refrigerant pressure of 2 to 5 lbs. (the compressor being out of operation as a matter of course), in order to prevent the entrance of air and moisture. The opening must then be made quickly, and immediately plugged air tight.

When any system is stopped, most of the refrigerant should be pumped back into the condenser-receiver, to avoid extreme pressure in the system at high room temperature. Only enough refrigerant should remain in the "low side" to maintain a pressure of 5 to 15 pounds, it being very important to maintain such pressure in order to make certain that no air or moisture can enter the system through leaks.

Refrigerant Dryer

The best way to remove moisture from the system is by means of a dryer. This dryer consists of a length of pipe, containing calcium oxide, and is provided with proper screens to retain the oxide. This dryer should be placed in the liquid line and must be of ample size in order to avoid undue pressure drop.

Any time expended in taking the above precautions will be saved a thousand fold, and avoid endless grief as well.

Arco Opens Air-Filter Plant in Chicago

CHICAGO—American Radiator Co. announces the opening, last month, of a new plant, located at 1330 W. Congress St., here, devoted exclusively to the manufacture of all sizes and types of Arco air filters.

The new plant is equipped with specially-designed automatic machinery which according to A. R. Herske, American Radiator's vice president and general sales manager, is capable of producing air filters to meet the requirements of any system.

In addition, a fully-equipped research and development laboratory is being prepared. This laboratory will be at the disposal of any manufacturer having air filter problems.

Eastern Engineers Named Airtemp Distributors

BALTIMORE—Eastern Engineers, Inc., a new company, has been appointed distributor of Airtemp air-conditioning and heating equipment, manufactured by Airtemp, Inc., subsidiary of Chrysler Corp.

Survey by Magazine Indicates Uptrend In Conditioning

NEW YORK CITY—A definite upward trend in the use of air-conditioning equipment during 1936-37 is indicated in a survey of 1,000 business men recently conducted by *Business Week* magazine.

In the survey, business men were asked if they were considering the installation of air-conditioning equipment; where they would use the equipment; and whether or not the name of any manufacturer or distributor with the general term "air conditioning" meant anything to them in making the purchase.

Last year, during a similar survey, 45% of those replied said they were considering installation. This year's returns increased the number to 70%. Twice as many as last year's total thought of a particular air-conditioning firm when considering a purchase.

Twenty per cent of the installations will be for industrial plants, the survey revealed. The other will be for homes, stores, and offices. Offices and stores are slightly in the lead in 1936-37 planning; homes led in the 1935 survey.

N. Y. School Begins Conditioning Course

NEW YORK CITY—New York Technical Institute, Inc. has inaugurated a six-months' course in air conditioning, arranged in 60 sections, under the direction of Eustace C. Soares, past president of New York chapter of American Society of Refrigerating Engineers.

The course covers air conditioning and refrigeration theory and principles, survey, layout, estimating, actual installation, operation, testing, and servicing. Technical instruction is combined with actual shop work, laboratory experiments, and tests on the school air-conditioning systems and apparatus, including ducts and refrigerating plants.

Assisting Mr. Soares in conducting the course are Brutus Gundlach, registered architect, and George A. Belsky, chief draftsman of the air-conditioning engineering department of Servel, Inc., New York City.

H-B Co. Introduces Motor-Operated Psychrometer

PHILADELPHIA—H-B Instrument Co., Inc. has just brought out a motor-operated aspirating psychrometer, designed for use by air-conditioning engineers in making humidity readings. Through use of the instrument, it is claimed, accurate readings may be made in one minute.

The psychrometer is offered in two portable types: self-contained, with battery, and plug-in, operating on 110-volt, 60-cycle current.

Both models draw air across mercury bulbs at a steady velocity. Thermometer range is from 30 to 120° F. The thermometers are placed near the end of the intake sleeve, the air passing first over the dry bulb and then over the wet bulb. Wick of the bulb extends through the intake sleeve into a water chamber below the bulb.

Battery-type instrument is intended for use where current is not available, or where it is inconvenient to plug in—department stores, railroad cars, and the like. Standard batteries are used.

Front part of the carrying case is removable; the case is carried upright so that water may be kept in the water chamber, making the instrument available for instant use.

Table for computing relative humidity and pocket slide rule for determining the direct reading relative humidity, are furnished with each instrument.

The Buyer's Guide

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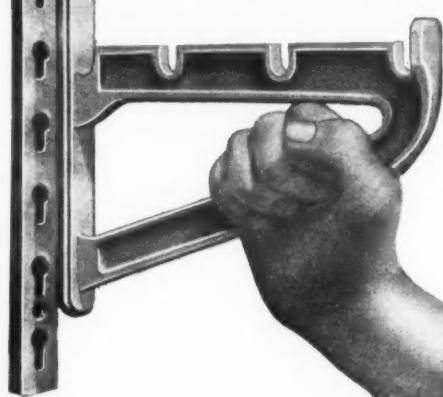
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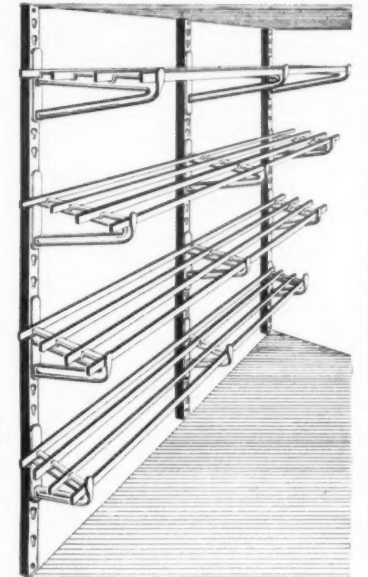
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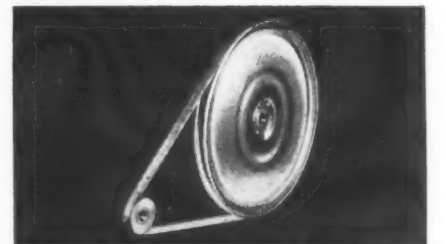
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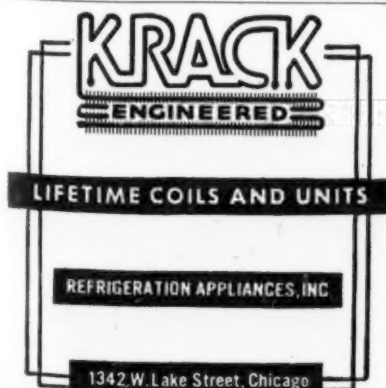
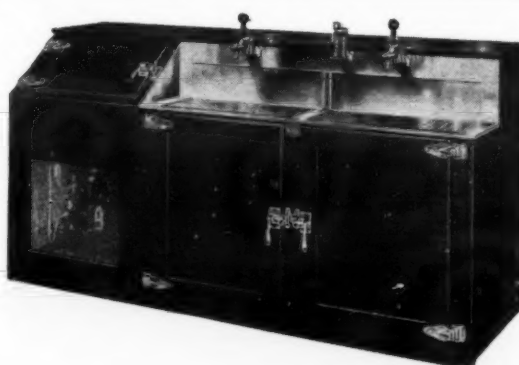
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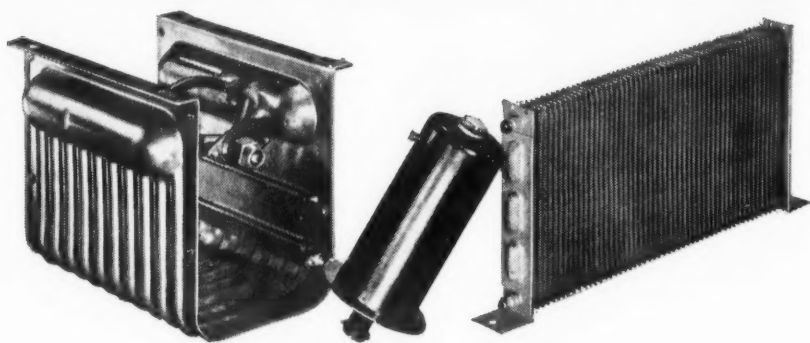
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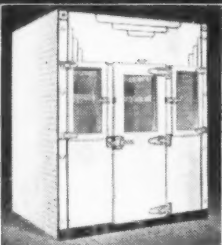
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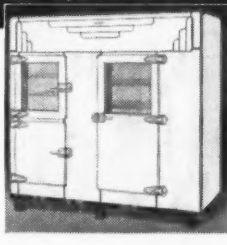
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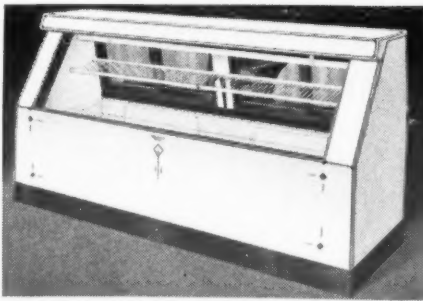
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COMMERCIAL Service Manual

By K. M. NEWCUM

Construction and Safety Devices Used on Liquid Receivers

CHAPTER 6—Commercial Condensing Units—Continued

Liquid Receivers for Air Cooled Condensers

The liquid receiver, as the name implies, is a tank or cylinder for receiving the liquid refrigerant formed in the condenser. The receiver also stores this liquid to be supplied to the evaporator or evaporators as needed.

Its location is usually below the condenser. It may be either horizontal or vertical.

Most commercial receivers are fabricated of seamless steel tubing. The ends are either spun over and closed or end plates welded in. They may also be made of two open-end cylinders welded in the center. It is not uncommon to solder the end plates into the receiver.

Most commercial condensing units are equipped with a shut-off valve between the receiver and condenser. For the purpose of identification this valve will be called "condenser line shut-off service valve."

The location of this valve on a York compressor, for example, may be noted in Fig. 65. Its purpose is to stop the flow of gas from the liquid receiver when removing or repairing either the condenser or receiver.

Many commercial condensing units are shipped charged with refrigerant and oil. In such a case, the liquid is stored in the receiver and both the liquid line shut-off valve and the condenser line shut-off service valve will be closed.

When units are shipped charged with refrigerant they come under the following I.C.C. regulations: machines or apparatus assembled for shipment containing more than 15 lbs. weight of liquid or gas for their operation, refrigeration machines of the self-contained type containing over 25 lbs. weight of refrigerant, and refrigeration machines to the remote control type consisting of several units shipped separately and each containing over 25 lbs. weight of refrigerant, must be tested by internal pressure to at least four times the vapor pressure of the refrigerant at 70° F.

This would indicate that liquid receivers having capacities as above mentioned and shipped with liquid would be factory tested to at least the following pressures:

SO₂—4 x 34.9 or 139.6 lbs. per sq. in.
Methyl chloride—4 x 58.8 or 235.2 lbs. per sq. in.

Freon—4 x 70.1 or 280.4 lbs. per sq. in.

Various ordinances and codes call for safety devices in liquid receivers to prevent their bursting in event the receiver is subjected to high temperatures resulting in high internal pressures.

The most common safety device used is a fusible metal plug. This plug is screwed into the end or top of the receiver. Its location on the York receiver may be noted in Fig. 65.

Fig. 69 shows the fusible metal safety plug arrangement in the Westinghouse receiver. Note that the fitting into which the fusible plug is fitted is threaded 3/4-inch pipe thread on to which a vent tube may be connected to allow a vent line to be run to the outside of the building.

Local codes govern this part of the installation and they should be followed when connecting up to safety devices.

The fusible metal plug is filled with a low melting point alloy. Various metal point alloys are used by the several manufacturers. 165° F. and 212° F. are two of the standard melting points while some manufacturers furnish fuse plugs with 230° F. metal.

The service man should examine the receiver of any system being serviced, particularly if it is necessary for any reason to apply heat to it. Bear in mind that any of these fusible metal alloys have melting points far below the melting point of soft solder.

Leaks around fusible metal plugs are very rare. However, if the plug leaks through the metal it is necessary to remove all the refrigerant from the receiver before removing the plug for replacing. Never in any case attempt to solder the fusible metal plug into the receiver or attempt to repair the plug by applying heat to it with pressure in the receiver.

A leaky fuse plug should be replaced with a new fusible metal fuse plug and not with a solid non-fusible plug.

Liquid receivers all have more capacity than their actual normal operating refrigerant charge. This additional capacity, is to allow for pumping the refrigerant from the evaporators back into the receiver.

The normal refrigerant charge fills the receiver to around one-third of its capacity. This may vary a few pounds one way or another without any material effect on the operating head pressure.

The main points to consider are, first: that the horizontal receiver with the liquid line shut-off service valve on top, or the vertical receiver with valve on top is equipped with a dipper or liquid tube such as shown in Fig. 70 that extends down to near the bottom of the receiver.

So long as the liquid level is above this tube during normal operation, the system will operate at full capacity.

Second, a slight amount of reserve liquid should be maintained, that is, the liquid level should be from 1/2 inch to 1 inch above the bottom of the tube in the horizontal receiver, and from 2 inches to 3 inches in a vertical receiver is desirable.

Third, any liquid in excess of this normal charge is not desirable as it takes up space needed for compressed gases and materially reduces the condensing capacity resulting in higher head pressures.

Fourth, this extra receiver capacity over and above the normal charge is known as pump down capacity, and is very necessary should it become necessary for any reason to pump the refrigerant from the evaporators into the receiver. This is especially true where several flooded lowside float valve evaporators are connected to one condensing unit.

The practice of loading the liquid receiver with a charge way over and above that required for normal operation was considered necessary and was common practice in ammonia and CO₂ systems. This may be explained as being necessary for the

(Concluded on Page 17, Column 1)

Fusible Safety Plug

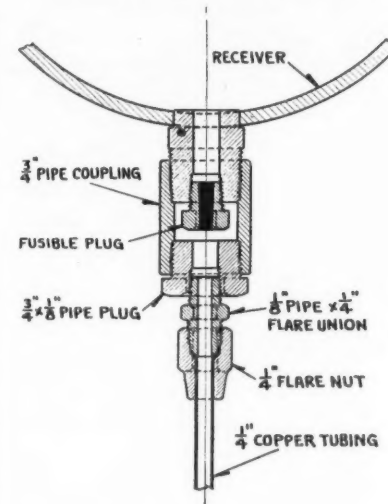


Fig. 69—Fusible metal safety plug arrangement in Westinghouse liquid receiver.

Vertical Liquid Receiver

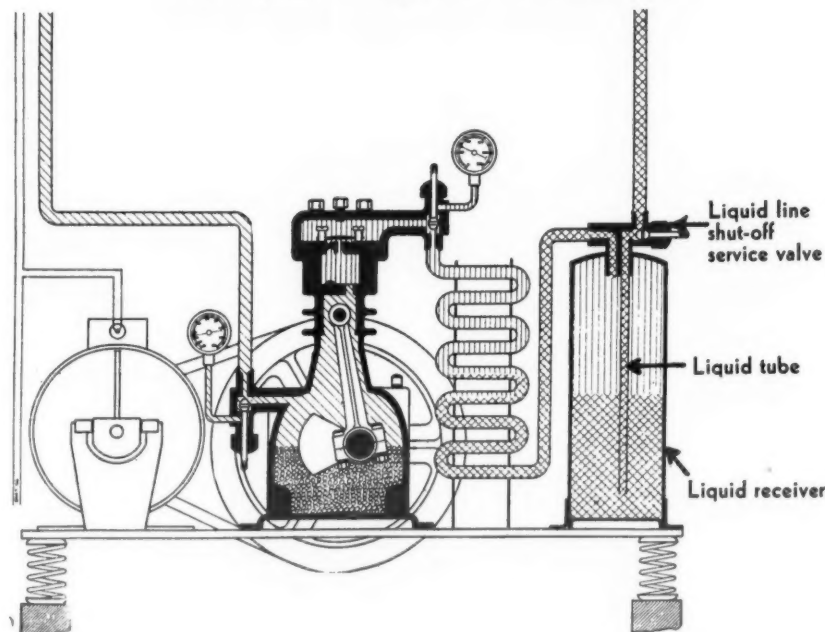


Fig. 70—Kelvinator flooded system with vertical receiver which has the inlet and outlet at the top of the receiver.

Details of Condenser and Receiver Connections

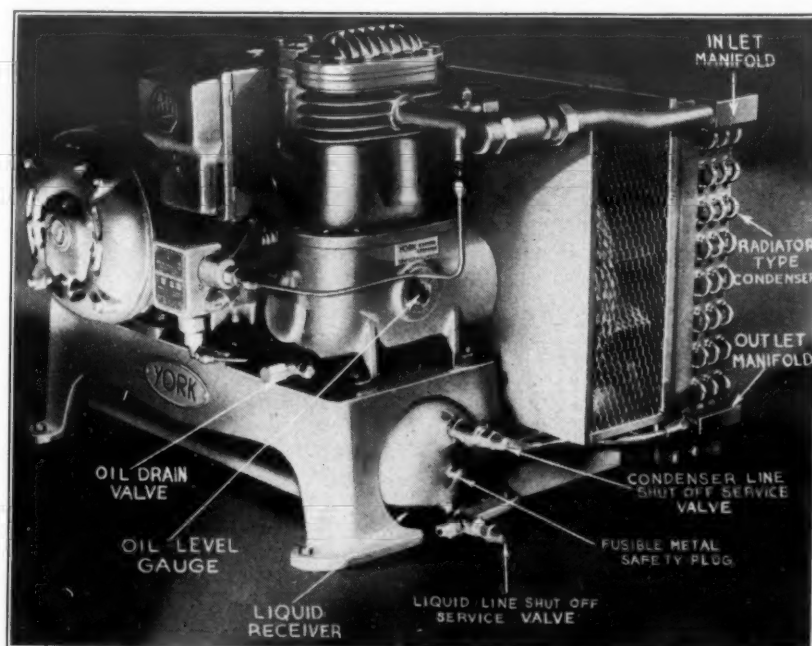


Fig. 65—York compressor, showing location of valves and gauges important to service man.

Determining Height Of Refrigerant In Receiver

(Concluded from Page 16, Column 5)
reason that continuous slight leaks at stuffing boxes and other joints were not uncommon, and the over or reserve charge made frequent recharging unnecessary.

Some liquid receivers are equipped with a bulls-eye type or some other type of sight glass or liquid indicator. This convenience provides a visible means of determining the liquid level.

For receivers not equipped with a liquid level indicator, the exact liquid level may be determined by playing the flame of a blow torch in a direct narrow up and down path on the receiver. Play the flame in this path until the receiver is warm. By feeling along this heated path, the level will be at the point where above this point the receiver is hotter than it is below this point.

The accuracy of this test is possible because the part of the receiver above the liquid will heat rapidly, while the part of the receiver below this level will not heat rapidly as the liquid refrigerant is absorbing the bulk of the heat from the flame.

Pressure Gauge Important

The importance of using a pressure gauge when pumping the refrigerant from the evaporators to the receiver or what is commonly called "pumping the system down" must not be overlooked.

Assume a condition where several different service men have been working on the job and each service man for reasons of his own added some refrigerant to the system. It is possible and not at all uncommon to find the entire receiver and possibly a part of the condenser filled with liquid. Then it is found necessary to pump the system down.

With the receiver already filled, the compressor continues to pump into the condenser until it is filled with liquid; then the pressure rises very rapidly until either a joint or gasket blows or the receiver bursts. This is particularly true on a system not equipped with a high-pressure cut-out. However, if a pressure gauge is installed and operating, the service man may observe any excessive pressure and connect an empty refrigerant cylinder in the system to receive this over-charge.

Another hazardous condition that has caused some serious damage is where a system without a high pressure cut-out is operating with the receiver completely filled with liquid and the liquid line strainer or filter near the receiver completely clogged, acting the same as closing the liquid line shut-off service valve, and allowing the compressor to pump the evaporator charge down.

It is obvious that this high pressure will cause something to go. It might blow the fuse, burn out the motor, break or burn the belt, or cause some part of the system to burst, in any event creating a hazardous condition that would not have existed if the liquid receiver were not over-charged.

Remove Excessive Charge

Needless to repeat, it is important that the liquid level be determined and where the charge is over normal and no allowance is made for pumping down that the excessive charge be removed.

A very convenient device for determining a shortage of refrigerant is the liquid indicator. It is installed in the liquid line near the receiver and the system put into operation. The refrigerant flow is directed up to the sight glass and if there is a shortage of refrigerant, which would mean that part liquid and part gas is being supplied to the refrigerant control, the presence of gas in this liquid circuit would be indicated by bubbles.

By adding refrigerant slowly through the low side, the level in the receiver will raise to the liquid line valve or liquid tube forming a perfect liquid seal. At this point the bubbles should cease, indicating a liquid seal between the throttle valve and receiver. Depending on the size of the system and receiver, a small reserve charge may be added to raise the level to a point previously mentioned. The indicator may then be removed from the line or be left there for future use as desired. The indicator

is also helpful in determining the condition of the refrigerant, that is, any discoloration is readily noticeable.

Liquid Receiver for Water Cooled Condensers

Liquid receivers used on condensing units using the water cooler condenser are exactly the same as those used with air-cooled condensers.

Letters from Service Men

Replacement Controls For Absopure Machines

Editor's Note: In the Oct. 28 issue in the column headed "Service Methods" on page 28, a reader asked the following question: "We need a cold control or thermostatic switch for an Absopure refrigerator (Baby Grand). The refrigerator was made by General Necessities Co., Detroit. The switch originally was manufactured by the Bishop & Babcock Mfg. Co., Cleveland."

The following letter was received recently as a reply to this question.

James Kelley
Refrigeration Technician
P. O. Box 476, Monroe, Mich.
Nov. 6, 1936.

Editor:

Referring to a query in the Oct. 28 issue by Briggs-Barrett Electric Co., Logansport, Ind., relative to needing a thermo switch for an Absopure refrigerator:

Why not use a KRS Ranco control with a dial plate to make it more artistic on a (baby grand) Absopure; on other models you can use other controls such as Penn, Cutler-Hammer, or Tag.

In making the change, it is necessary to cut the front panel in twain. This is done for convenience in installing and access to the expansion valve.

Solder your bulb clamp bolts onto your threaded section, use nuts for fastening, use two pieces, cut from 5/16 inch tubing 1/4 inch long for washers on clamp bolts, start your bulb and clamp on suction line in front and then push back as far as it will go against bend of tube and fasten there. Of course, you must spot your holes for your control buttons and screw bolts.

It is not necessary to change control setting, if bulb is clamped down, and tube not touching the evaporator.

This year I have serviced 15 Absopures all models; in 13 I installed modern controls. I satisfy my customers on these jobs that the controls will pay for themselves in six months time with a money back guarantee if not getting the same control service as any other refrigerator in town.

Universal Cooler Corp., 7424 Melville Ave., Detroit, can replace any item for an Absopure.

JAMES KELLEY.

Greatest Service Handicap Is Lack of Catalog Data

Bill's Rambler Electric Shop
Ashkum, Ill.
Nov. 3, 1936.

Gentlemen:

I am sending in the catalog application blank. I had no idea you were undertaking such a task. I thought our names were just on file for the manufacturers to read. Its sure swell of you to do this for us as the greatest handicap in efficient and prompt services for a small country shop is the difficulty in obtaining repairs for so many different makes and models. Machines around here range from the very earliest to the latest types and represent many different makes.

I get the NEWS and have the MASTER SERVICE MANUAL both of which I consider very valuable assets to my business. I wish the NEWS had a bigger Service department though. There are a lot of interesting hints and methods which could be printed.

I am enclosing a Money Order for \$3.00 for which please send me your 1936 REFRIGERATION AND AIR CONDITIONING SPECIFICATIONS. I want a book that gives the following information about every model: Oil charge, gas charge, operating pressures, cycle periods, adjusting data, parts numbers, etc. I understand that is what it contains, if not please don't send it.

If the MANUAL on Majestics contains more information than the MASTER SERVICE MANUAL, please send it too. I want to know how to go about opening up the sealed units and how to resolder them, what kind to use.

What is the proper way to charge the bellows for the electric switch (thermostatic expansion with Mercury bulb type) for the Zerozone Model B1

domestic refrigerator. It uses SO₂ and must be about 10 years old.

Does anyone make an adaptor for 3/4 inch to 9/32 inch drives for using 3/4 inch sockets with ignition set handles?

Thanking you for the above help and hoping for your prosperity.
W. FLORENT FRONVILLE.

Answer: The SPECIFICATIONS BOOK gives the Model No. of each unit and the Compressor Model No., the motor horsepower and r.p.m., the belt size, refrigerant and oil charge, the stroke, bore and number of cylinders, type of seal and control, and various other data but it does not give parts numbers or servicing instructions. The book contains 512 pages and will be extremely valuable to any service man.

Will Zerozone Co., Detroit, please answer question regarding the proper way to charge bellows on Model B1.

Corrections in Commercial Service Manual Articles

Gruber Electric Co.
"Electrical Appliances Sold and Repaired"

309 Vernon St., Ironton, Ohio
Nov. 6, 1936.

Editor:

I have found a couple of mistakes in Mr. K. M. Newcum's articles in your paper. In the issue of Sept. 9, 1936, page 41, article on commercial condensing units, the illustrations are not right. Fig. 38 was called a Frigidaire 2-cylinder compressor and was really an Absopure, and the Fig. 39 was called an Absopure and was a Frigidaire. Evidently the number and titles had been switched.

In the issue of Nov. 4, 1936, page 31, the text says:

"Fig. 58 shows a typical two-way compressor valve. Note that when backseated, as illustrated,"—the valve illustrated in Fig. 58 is not backseated.

These errors are not serious but you will probably want to correct them when the articles are printed in book form.

I find your magazine very helpful to me in my work and I find less errors than in any other technical magazine.
A. W. GRUBER.

Repair Parts for Rice Refrigerators

Frigid Service Co.
115 No. 16th St., Lincoln, Neb.

Gentlemen:

Can you advise us where we can purchase repair parts for the Rice refrigerator?
J. F. WICKHAM.

Answer: Write to Isaac Rice, Jr., 295 Fifth Ave., New York City, for information on the availability of repair parts for the Rice refrigerator.

Commends Catalog Mailing Plans

C. Devoe Leedy
The "Service" Man
616 W. Center St., Warsaw, Ind.
Nov. 6, 1936.

Gentlemen:

I notice that my subscription will soon be run out. So, please find money order enclosed to cover another year's subscription to AIR CONDITIONING AND REFRIGERATION NEWS.

As a service man, I commend you highly for the effort you are putting forth to establish the Catalog Mailing Service.
DEVOE LEEDY.

New Jobbing Firm to Operate in Canada

LONDON, Canada — Refrigeration Supplies Co., Ltd., has been organized and will soon enter the Canadian field as jobbers of refrigeration parts and supplies. Offices and warehouse will be located at 1127 Dundas St.

C. W. Hadden, general manager of Kelvinator of Canada, Ltd., will be president of the new company. F. A. M. Dawson will be vice president and general manager, and R. L. C. Keith, secretary-treasurer. Howard A. Lewis and C. E. Abbs, in addition to the above officers, will compose the board of directors.

It is understood that arrangements have been completed for the new firm to handle the exclusive Canadian distribution of Peerless coils, Ranco controls, Tecumseh compressors, Temp-rite products, and other well known brands of equipment.

Chicago Service Companies To Meet Nov. 24

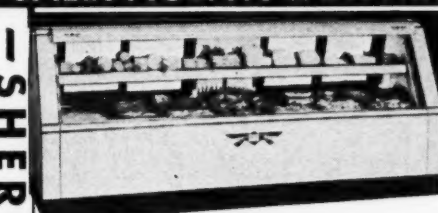
CHICAGO—The Refrigeration Service Association of Chicago, whose members include the leading companies specializing in installation and maintenance work, will hold a meeting at the Palmer House, Tuesday, Nov. 24.

A. G. Weil of Refrigeration Maintenance Corp., 365 E. Illinois St., is secretary of the association.

The Buyer's Guide

Special rates apply to this column only.
Write Advertising Dept. for full information.

SALES AGENTS & DISTRIBUTORS WANTED



We manufacture a complete line of DISPLAY AND STORAGE EQUIPMENT FOR RETAIL FOOD STORES

Refrigerator Cases of all kinds, Market Coolers, Reach-in Boxes, Meat Racks, Porcelain Partitions, etc.

Use the complete Sherer line to maintain your volume and profits as the demand for household boxes tapers off. Write us today.

Desirable territories now open. Write us for details.

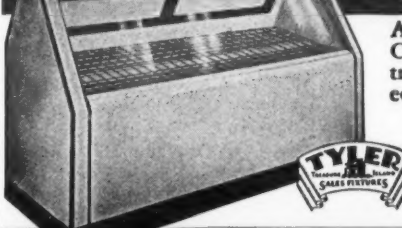
SHERER-GILLET COMPANY
MARSHALL, MICHIGAN
ESTABLISHED 1852



MANUFACTURERS

Seamless
Brass & Copper Tubing
Refrigerator Tubing
Water Service Tubing
Carton Packed Tubing
Formed Tubing
Electro Tin Plated Tubing

TYLER'S NEW WELDED STEEL REFRIGERATOR CASES



At last a general purpose case at a sensible price. Offers every advantage of the most costly cases at tremendous savings. Modern in every detail. Comes equipped with coils. Single and double duty models.

AN AMAZING VALUE

Hundreds in use. Perfect refrigeration for meat, dairy and delicatessen products and all perishables sold in food stores. Write or wire for all the facts.

TYLER Sales-Fixture CO. Dept. E, Niles, Mich.

3 INCH INSULATION-TRIPLE GLASS

ACME PIPE COILS

"THE COILS BY WHICH OTHERS ARE JUDGED"

FLAT
DOUBLE FLAT
BOX OVAL
CYLINDRICAL
RECTANGULAR



HARDENING
ROOM COILS

ACME
PROCESSED

JACKSON ACME INDUSTRIES, Inc. MICHIGAN

Quality by WEBER



—with a background of forty years of progressive development in the design and manufacture of world-famous retail store equipment—Weber products include the most complete line of Refrigerated Display Cases and Boxes—that offer the greatest dealer possibilities.

WEBER SHOWCASE & FIXTURE CO., INC.
3700 Avalon Blvd.
LOS ANGELES

Compact and Convenient For Light or Heavy Work

IMPERIAL Soldering and Brazing Outfits

ONE of these practical outfits is shown at left. Torch burns acetylene, the tips drawing oxygen from the atmosphere.

No. 32 Outfit. Torch, four tips, soldering iron, 6 ft. hose, in handy steel case.....\$9.00

IMPERIAL BRASS MFG. CO.

565 S. Racine Ave. CHICAGO

Make Your Own Ice Cubes

In either the 350 or 650 Refrigerator, through the addition of the new ICE CUBE MAKER. Used as an accessory, but combined with the standard back wall coil, assures uniformity of temperature and humidity in food and beverage compartments. NO MATTER HOW HEAVILY FROSTED THE ICE MAKER BECOMES, YOU ARE GUARANTEED PERFECT EFFICIENCY AND UNIFORM REFRIGERATION.

Made in 2 sizes—126 large cubes (14.4 lbs. of ice) and 126 small cubes (7.64 lbs. of ice)

Write for Illustrated Folder

GLOEKLER MANUFACTURING COMPANY
419 Fourth Avenue • Pittsburgh, Pa.

AUCTION — AUCTION
1000-ELECTRIC REFRIGERATORS
 To be sold for storage charges
 By order of the warehouse authorities
 Starting on **TUESDAY NOV. 24th**, at
 11:00 a. m., C.S.T., at
GRISWOLD-WALKER-BATEMAN CO.
 Warehouse
 4300 South Damen Ave., Chicago, Ill.
 Consisting of such nationally known
 brands as General Electric—Frigidaire
 —Norge—Electrolux and Stay-Cold—
 Etc.—New and Used—Assorted Sizes.
 These refrigerators will be sold to the
 highest bidders for cash without
 reservation.
MARSHALL NACHBAR & CO.
 713 N. Wells St. Chicago, Ill.

Classified

RATES: Fifty words or less, one insertion, \$2.00, additional words four cents each. Three insertions \$5.00, additional words ten cents each.

PAYMENT in advance is required for advertising in this column.

REPLIES to advertisements with Box No. should be addressed to Air Conditioning and Refrigeration News, 5229 Cass Ave., Detroit, Mich.

POSITIONS AVAILABLE

WANTED—Several commercial refrigeration and air conditioning men with ability to sell, to teach selling and application of refrigeration and to organize dealer coverage. This added man power is needed to intensify activity in four districts of a large well-established manufacturer whose products have national distribution. Change of residence may not be required but must be free to travel. Cite your experience in all the above points in your reply. Applications will be held strictly confidential. Our own employees know of this advertisement. Box 867, Air Conditioning and Refrigeration News.

ENGINEER—experienced in development, design and application of household electric refrigerating units. Must know production methods. Must be thoroughly experienced in design and construction of hermetic motor-compressor refrigerating units. Box 870, Air Conditioning and Refrigeration News.

DESIGNER—Engineer with thorough experience in domestic cabinet design and on domestic compressor development—A real opportunity in an active permanent organization. **GEORGE MASTERS**, Roosevelt Park P. O. Box 2016, Detroit, Mich.

POSITIONS WANTED

HAVE SIX YEARS' experience on service and installation of horizontal, rotary and gun type burners, 5 years at plumbing, pipe-fitting, also have stoker experience. Am taking a course by the Refrigeration and Air Conditioning Institute. Desire steady work with a heating or air-conditioning company. Willing to go anywhere. Box 871, Air Conditioning and Refrigeration News.

THE SERVICES are available of an outstanding merchandiser of gas and electric household appliances, now employed as sales manager for one of the most successful wholesale distributors of such products. Will consider an association with a manufacturer or distributor of major appliances located anywhere. If interested in personal interview address Box 872, Air Conditioning and Refrigeration News.

BUSINESS OPPORTUNITY

FINE BUSINESS Opportunity for active and experienced partner for commercial refrigeration and air conditioning sales field with successfully established organization in metropolitan New York area. No investment required. References thoroughly investigated. Address all replies, covering complete information in first communication, to Box No. 145, Madison Square Station, New York City.

FRANCHISE WANTED

MANUFACTURERS' AGENT, with an enviable following among dealers and refrigeration service accounts in Metropolitan New York, desires to hear from

manufacturers of refrigeration supplies with view of handling a few lines direct to the trade. Unquestionable references can be furnished. Box 864, Air Conditioning and Refrigeration News.

MANUFACTURERS REPRESENTATIVE. Has personally covered Pennsylvania, the South and most of the territory east of the Mississippi. Prepared to cover thoroughly the trade during the coming dead season for manufacturers who have any or all of this territory open. Connected with refrigeration accessories twelve years. One year's protection. Box 868, Air Conditioning and Refrigeration News.

EQUIPMENT FOR SALE

ATTENTION, SERVICE MEN! We have in stock a number of used Frigidaire units to be sold "as is." These units are not stuck up. Model S twin cylinder at \$17.50. Model G, metal base, at \$22.50; wooden base at \$17.50. Twin A at \$30.00. Have 1/2 H.P. Frigidaire F-12, slightly used, at \$50.00. One Model C compressor, recently reoperated, at \$75.00. Also have a lot of Frigidaire commercial coils, flooded or D.X. type. These are new and some reoperated. Will give full particulars if interested. Write **REFRIGERATION SURPLUS JOBBERS**, 5622 Woodlawn Ave., Cleveland, Ohio.

REPAIR SERVICE

GENERAL ELECTRIC and Majestic hermetically sealed units repaired and exchanged. Guaranteed work. Wholesale only. Give model when writing. All prices quoted f.o.b. Chicago. **AMERICAN REFRIGERATING ENGINEERS, INC.**, 2257 Silverton Drive, Chicago, Illinois.

MAJESTIC & GRIGSBY-GRUNOW original and genuine factory refrigerator and radio service. All parts, service replacement units will carry regular factory six-month guarantee. Buy only through our authorized distributors, dealers or ourselves. Complete stock. Majestic radio parts and tubes. Write for particulars. **GRIGSBY-GRUNOW COMPANY**, 5801 Dickens Ave., Chicago, Ill.

MAJESTIC HERMETIC UNITS repaired and exchanged at \$18.50, f.o.b. our factory Chicago. Every unit undergoes complete

tests for temperature, cycling, wattage consumption, and quietness on genuine Majestic test equipment from the Grigsby-Grunow plant. Six months' factory guarantee. **REFRIGERATION MAINTENANCE CORP.**, 365 E. Illinois St., Chicago, Ill.

REFRIGERATION CONTROLS, domestic types, repaired. Ranco pencil types \$1.75, all box types, \$2.00. Majestic \$2.50. **UNITED GAUGE AND INSTRUMENT COMPANY**, 436 West 57th Street, New York City.

Patents

Issued October 13, 1936

2,056,970. COOLING SYSTEM. Charles S. Leopold, Elkins Park, Pa. Application April 18, 1933, Serial No. 666,668. 11 Claims (Cl. 62-141)

2,056,980. AIR CONDITIONING SYSTEM FOR VEHICLES. Richard L. Owen, Santa Monica, Calif. Application March 25, 1933, Serial No. 662,695. 8 Claims (Cl. 257-7)

2,057,036. PORTABLE REFRIGERATOR. Abraham Korinsky, Detroit. Application May 3, 1935, Serial No. 19,644. 3 Claims (Cl. 220-9)

2,057,050. TEMPERATURE REGULATION. Carl A. Otto, Milwaukee, Wis., assignor to Johnson Service Co., Milwaukee. Application July 13, 1933, Serial No. 680,301. 17 Claims (Cl. 236-68)

2,057,054. TWO-TEMPERATURE THERMOSTAT. Fred W. Powers, Chicago, assignor to The Powers Regulator Co., Chicago. Application Sept. 4, 1934, Serial No. 742,523. 9 Claims (Cl. 236-47)

2,057,058. REFRIGERATOR SHIPPING CONTAINER FOR CONTAINER CARS. Edward Rice, Jr., New York, N. Y., assignor to International Carbonic, Inc., Wilmington, Del. Application June 20,

1934, Serial No. 731,540. 17 Claims (Cl. 62-91.5)

2,057,101. REFRIGERATING PLANT. Emil Kagi, Winterthur, Switzerland, assignor to the firm Sulzer Freres Societe Anonyme, Winterthur, Switzerland. Application Nov. 23, 1933, Serial No. 699,367. In Switzerland April 29, 1933. 5 Claims (Cl. 62-4)

2,057,106. APPARATUS FOR CONDITIONING AIR. Deane L. Nixon, Kansas City, Mo., assignor of one-half to Stanley M. Hall, Kansas City. Application Oct. 24, 1932, Serial No. 639,201. 4 Claims (Cl. 62-131)

2,057,236. HUMIDIFIER. William B. Hodge, Charlotte, N. C., assignor to Parks-Cramer Co., Fitchburg, Mass. Application June 22, 1933, Serial No. 618,677. 7 Claims (Cl. 236-44)

2,057,299. HEAT EXCHANGER. Benjamin S. Foss, Brookline, Mass., assignor to B. F. Sturtevant Co., Hyde Park, Mass. Application Jan. 18, 1936, Serial No. 59,705. 8 Claims (Cl. 257-220)

2,057,381. PUMP FOR REFRIGERATING MEANS. Mahlon W. Kenney, Berwyn, and James D. Jordan, Elmhurst, Ill., assignors to General Household Utilities Co., Chicago. Original application Jan. 6, 1933, Serial No. 650,450. Divided and this application July 16, 1934, Serial No. 735,388. 7 Claims (Cl. 230-151)

2,057,408. COOLING ELEMENT FOR REFRIGERATING SYSTEMS. Sven W. E. Andersson, New York, and William R. Hainsworth, Larchmont, N. Y., assignors, by mesne assignments, to Servel, Inc., Dover, Del. Application Dec. 2, 1932, Serial No. 645,422. 13 Claims (Cl. 62-126)

2,057,429. ADJUSTABLE SHELF. Roy A. Heim, Evansville, Ind., assignor to Servel, Inc., New York, N. Y. Application July 25, 1933, Serial No. 682,056. 10 Claims (Cl. 211-153)

2,057,447. INWARDLY REMOVABLE REFRIGERATION UNIT. John R. Replogle, Detroit, assignor, by mesne assignments, to Copeland Refrigeration Corp., Mount

Clemens, Mich. Application Feb. 20, 1932, Serial No. 594,161. 1 Claim (Cl. 62-116)

2,057,457. METHOD OF MAKING EXPANSION JOINTS FOR ICE TRAYS. Guy L. Tinkham, Detroit, assignor, by mesne assignments, to The Inland Manufacturing Co. Original application March 10, 1934, Serial No. 714,908, now Patent No. 2,021,118, dated Nov. 12, 1935. Divided and this application Aug. 30, 1934, Serial No. 742,088. 9 Claims (Cl. 113-120)

2,057,505. CONDENSER FOR REFRIGERATING APPARATUS. Frederic L. Tarleton, Dayton, Ohio, assignor to General Motors Corp., Dayton. Application Oct. 31, 1934, Serial No. 750,868. 9 Claims (Cl. 257-36)

2,057,544. REFRIGERATOR SHELF CONSTRUCTION. Lee Stratton, Cincinnati. Application March 25, 1935, Serial No. 12,872. 1 Claim (Cl. 211-143)

2,057,597. COUNTERFLOW HEAT EXCHANGER. Melvin Sack, Louisville, Ky. Assignor to Henry Vogt Machine Co., Louisville. Application June 4, 1936, Serial No. 83,578. 7 Claims (Cl. 257-224)

DESIGNS

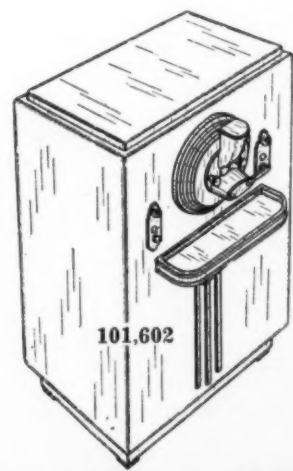
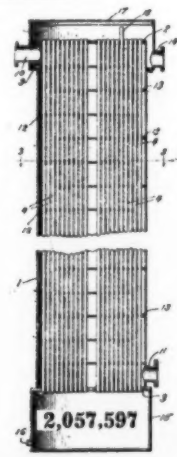
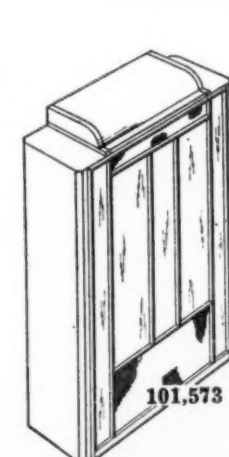
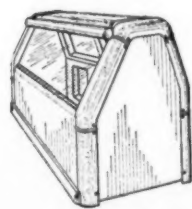
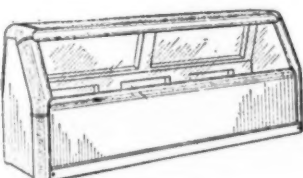
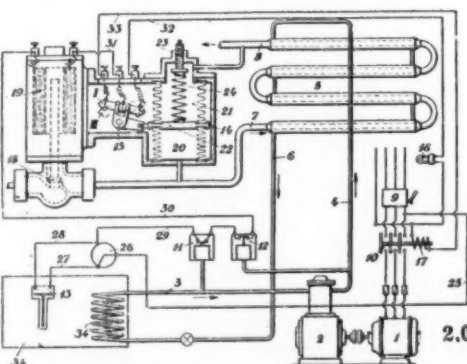
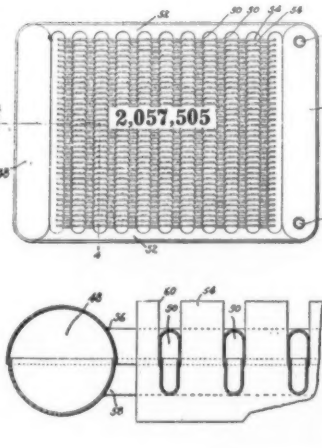
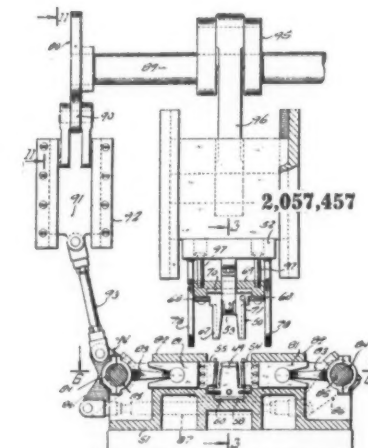
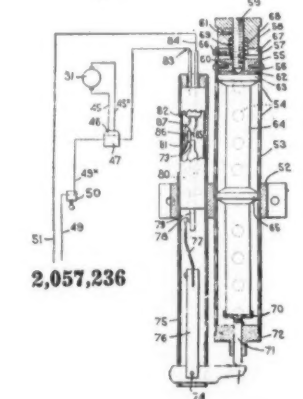
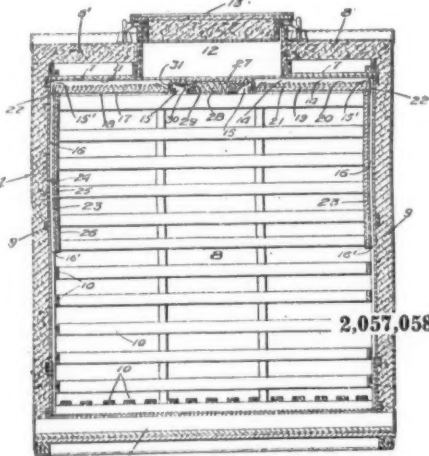
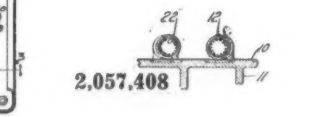
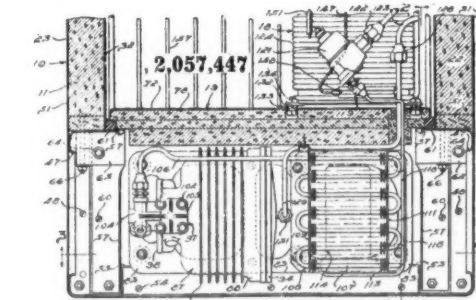
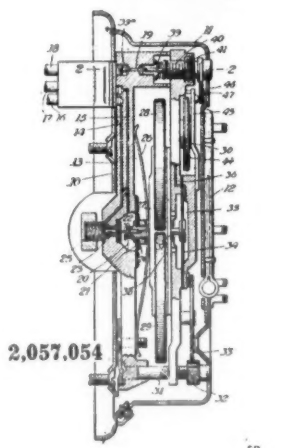
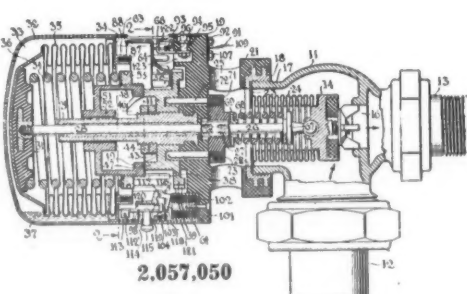
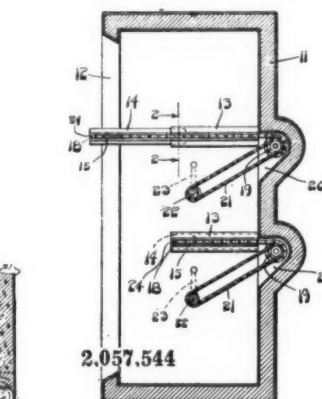
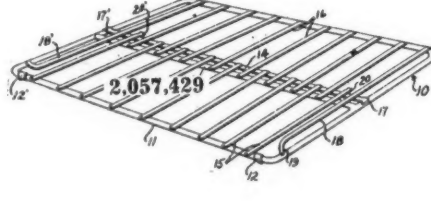
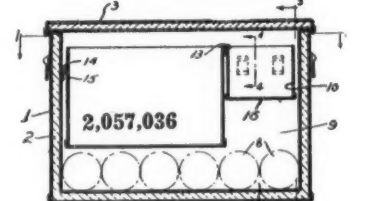
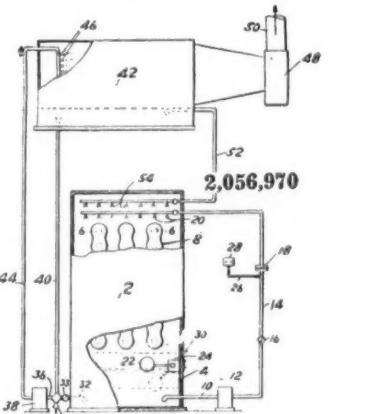
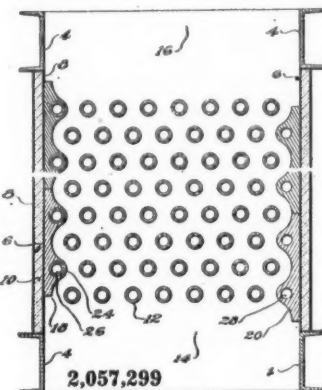
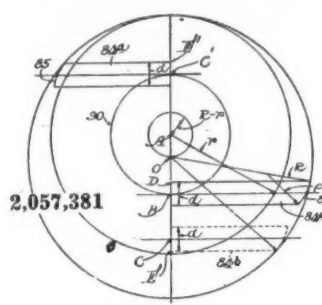
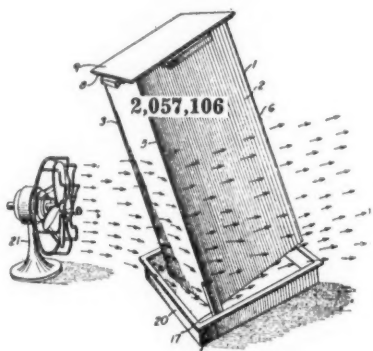
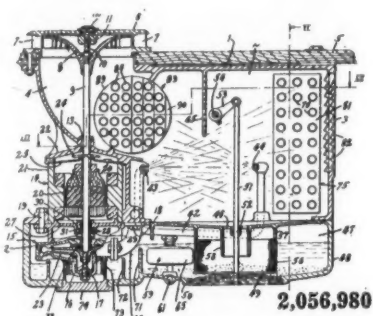
101,531. DESIGN FOR A DISPLAY CABINET. Fred Hoke, Indianapolis, Ind., assignor to Holcomb & Hoke Manufacturing Co., Indianapolis. Application Aug. 17, 1936, Serial No. 64,436. Term of patent 3 1/2 years.

101,573. DESIGN FOR AN AIR-CONDITIONING CABINET. Charles H. Victoreen, Cleveland. Application Aug. 1, 1936, Serial No. 64,177. Term of patent 7 years.

101,602. DESIGN FOR AN ICE CREAM MACHINE CABINET. Joseph C. Williams, Seattle, Wash. Application May 4, 1936, Serial No. 62,456. Term of patent 7 years.

PATENTS

HAVE YOUR patent work done by a specialist. I have had more than 25 years' experience in refrigeration engineering. Prompt searches and reports. Reasonable fees. **H. R. VAN DEVENTER (ASRE)**, Patent Attorney, 342 Madison Avenue, New York City.



BARLUM HOTEL
 WHERE OLD-FASHIONED
 HOSPITALITY AWAITS YOU

810 OUTSIDE ROOMS
 \$2 A DAY AND UP

DETROIT
 CADILLAC SQUARE
 BATES STREET

Questions

Rubber Display Case Doors

No. 2967 (Manufacturer, Pennsylvania)—"Kindly send us names of manufacturers who manufacture rubber sliding doors for display cases who are not listed in your 1935 DIRECTORY. Also names of manufacturers who manufacture steel wire shelving and butcher trays."

Answer: All such manufacturers that we know of are listed in the 1935 REFRIGERATION AND AIR CONDITIONING DIRECTORY.

Tiny Hotel Refrigerator

No. 2968 (Hotel Chain, New York)—"We are in the market for a number of small refrigerators approximately 1½ cubic feet capacity, about 48 inches tall and 16 inches square which we could put away in a clothes closet under the usual hat shelf and clothes pole and thereby take a minimum of floor space. We desire to have these refrigerators available for apartments or rooms without kitchenettes in order to provide tenants with ice cubes and a refrigerator for soft drinks so that they do not have to send down continually for ice and soft drinks to be delivered by a bell boy who is naturally entitled to a tip."

"We have been unable to locate any boxes to these specifications and wonder if you know of any company making something of this sort. One or two companies with whom we have discussed this matter are planning to make a box of this sort but cannot assure deliveries for five or six months. We should like to have such boxes immediately and do not want to wait this long."

"There is also some interest in a small or medium sized refrigerator of suitable appearance to stand in a living room and wonder if there is any such box available."

Answer: We know of no American manufacturer building small electric refrigerators of this size.

Electrolux manufactures absorption refrigerators of 1, 1½, and 2-cu. ft. capacity in Sweden, Germany, and England, in which countries the market for these midget boxes has been exceptionally good.

The absorption type of refrigeration system is much more suitable to cabinets of this size than the compression type; and at present there seems little likelihood that American electric refrigerator manufacturers will become interested in midget models.

Smallest electric refrigerator design introduced so far in the United States, the chest model (2¼ cu. ft.) was not a merchandising success.

As regards to a small medium size refrigerator of suitable appearance to be placed in the living room, you might get in touch with Electric Invisible Kitchen Co., 221 N. LaSalle St., Chicago.

Show Case Makers

No. 2969 (Manufacturer, Pennsylvania)—"We would be pleased to receive sample copy of your REFRIGERATION NEWS. Also, do you have any lists showing manufacturers of show cases and refrigerators?"

Answer: Manufacturers of display cases with and without refrigeration are listed on pages 174 and 176 of the 1935 REFRIGERATION AND AIR CONDITIONING DIRECTORY. Also by reading the weekly issues of AIR CONDITIONING AND REFRIGERATION NEWS, you will find that many manufacturers of display cases advertise in the columns of the paper.

List of Manufacturers

No. 2970 (Wholesaler, Kentucky)—"We would appreciate it if you would send us a list of the manufacturers who make electric refrigerators and air conditioned units."

Answer: See the July 1, 1936, and July 29, 1936, issues of the NEWS. The July 1 issue had the complete specifications of all leading manufacturers of household electric refrigerators; and the July 29 issue contained specifications of the leading manufacturers of air-conditioning equipment.

Fischman Address

No. 2971 (Distributor, Tennessee)—"Please give me the address of the Fischman Company."

Answer: 10th St. and Allegheny Ave., Philadelphia, Pa.

Household Specifications

No. 2972 (Manufacturer, Illinois)—"Can you furnish us with complete specifications of refrigerator condensing units and cabinets. Also, do these specifications include size or capacity of parts and manufacturers, such as of condenser coils and evaporators?"

Answer: Complete specifications of the leading household electric refrigerators and commercial refrigerating machines were published in the July 1, 1936 and May 6, 1936 issues of REFRIGERATION NEWS, respectively. These specifications give names of manufacturers of parts, capacities of some parts, and rated capacities of units.

Refrigerant Charge

No. 2973 (Reader, Illinois)—"Recently in referring to your Specification News for some data I noticed an item of a gentleman asking for a copy of REFRIGERATION NEWS containing an article on how to ascertain the proper amount of refrigerant in systems."

"Now I wonder if it would still be possible for me to get a copy. I am enclosing 20 cents and hope that that will cover the cost."

Answer: This article on refrigerants in air-cooled systems by L. K. Wright was published in the March 4, 1936 issue of REFRIGERATION NEWS.

Air Conditioning Definition

No. 2974 (Manufacturer, Michigan)—"The writer believes that an article has appeared in your publication, or in some other publication, recently, which gave a definition of 'air conditioning.' As I recall, I believe this article concerned a decision ruling of the Federal Trade Commission as to what, exactly, constituted 'air conditioning,' and how far a claim for 'air conditioning' could ethically go. I presume you have several angles on the use of the term."

"We do not have an encyclopedia handy, and we believe it probable that you have checked the interpretation of 'air conditioning' in the latest encyclopedias and in other authoritative publications."

"What we want, as an answer to this letter (if you will be good enough to give us a reply), is as follows:

1. Various authoritative definitions of "Air Conditioning," and the source of each.
2. Any information you may have regarding any Federal Trade Commission definition or limitation of "air conditioning."
3. Any further information you may care to give us."

Answer: In the October 28, 1936 issue of AIR CONDITIONING AND REFRIGERATION NEWS, on page 1, is an account of the Federal Trade Commission's latest decisions on the definition of air conditioning made in connection with the Corozone Air Conditioning Corp.

Essentials of Selling

No. 2975 (Distributor, Indiana)—"Kindly forward to us the issue of REFRIGERATION NEWS which contained the article by Hugh Galpin entitled 'Who-When-Where-How-Of Selling.'"

Answer: This article was published in the August 26, 1936 issue of REFRIGERATION NEWS.

Ice Cream Cabinet Lids

No. 2976 (Parts Jobber, Alabama)—"Could you advise us who manufactures new sub-top assemblies for ice cream cabinets and also the new lids."

"We have contacted various people through sources open to us and have been unable to locate what we want."

Answer: Manufacturers of tops and lids for ice cream cabinets are listed on pages 202 and 203 of the 1935 REFRIGERATION AND AIR CONDITIONING DIRECTORY.

Financing Commercial Sales

No. 2977 (Bankers, New York)—"In a previous issue of AIR CONDITIONING AND REFRIGERATION NEWS you carried an article concerning the plan developed by the National Commercial Refrigerators Manufacturers Association for the use of manufacturers in this field in connection with their Time Payment Sales."

"We are actively interested in this field and particularly in knowing about the activities of the Association and the plan described."

"I can't give you the exact date on which this article appeared, but I suppose you will know what I have reference to. Would it be possible for you to send me a copy of this particu-

lar article and any other items which may have appeared previously or subsequently on the same subject?"

Answer: The story about the finance plan recommended by several commercial refrigerator manufacturers to their dealers was published in the September 23, 1936 issue of AIR CONDITIONING AND REFRIGERATION NEWS.

This action was not an association activity, but was done voluntarily by several of the leading manufacturers in the field. There were some previous discussions, but this marked the first definite action taken since the NRA Code days.

Counter Freezer Makers

No. 2978 (Service Man, Washington)—"Please give me the names of manufacturers of ice cream counter freezers, other than Mills Novelty Company, Chicago."

Answer: Russ Soda Fountain Co., 5700 Walworth Ave., Cleveland, Ohio. Sherer-Gillett Co., Kalamazoo Ave., Marshall, Mich. Taylor Freezer Corp., Beloit, Wis. Tuthill Pump Co., 132 W. 63rd St., Chicago, Ill.

Freon Water Cooler?

No. 2979 (Commercial Engineers, Missouri)—"We noticed in one of your issues a month or six weeks ago that some company in Michigan advertised a line of Freon water coolers for air conditioning purposes. No doubt you know to whom we refer, and we wish you would put us in touch with them."

Answer: We are a little puzzled by your inquiry. A thorough search of our advertising for the past several weeks fails to reveal an advertisement that fits this description.

The nearest thing to it is an evaporative condenser manufactured by The Brus Co., 215 East 20th St., Kansas City, Mo., which is used to cool condensing water used in refrigerating systems for air conditioning work.

Small Blower Fans

No. 2980 (Service Man, Washington)—"Kelvinator in their current models are using a small centrifugal blower fan mounted on the top liner of their domestic boxes. I am desirous of obtaining small fans of this type and dimension, and wonder if you can tell me the name of the manufacturer who makes them or similar ones. I want a constant running vertical mounted fan that will fit in a three inch space."

"I have contacted the branches of General Electric, Westinghouse, and Wagner here but they do not have what I want."

Answer: The following manufacturers are specialists in the manufacture of blower equipment, and if they cannot supply your needs, they should at least be able to tell you where such equipment is available.

Allen Billmyre Corp., S. Norwalk, Conn. The Elliott Co., Jeannette, Pa. Ideal Commutator Dresser Co., Sycamore, Ill. Roots-Connorsville Blower Corp., Connorsville, Ind. Spencer Turbine Co., Hartford, Conn.

Coin Ice Cream Machines

No. 2981 (Ice Cream Maker, Wisconsin)—"I wish to inquire if you have any information as to who makes an ice cream vending machine, coin operated for ice cream bars, as it is most important that I know who makes such a unit."

"I am advised from various sources that there are several machines of this type being made but not yet put in operation so if you have any information along this line I would appreciate it very much."

Answer: We do not know of any manufacturers of ice cream vending machines. There used to be several on the market, which are not active now.

Below are listed the names of three manufacturers listed in the 1935 REFRIGERATION AND AIR CONDITIONING DIRECTORY who make coin-operated beverage vending machines, and who may also make ice cream vending machines, or have some information as to where they can be obtained.

Carbonic Equipment Co., 3516 Spring Garden St., Philadelphia, Pa. Jones Products Co., E. M. 23 Fourth St., N.W., Atlanta, Ga. Richardson Sales Corp., 1069 Lyell Ave., Rochester, N. Y.

Psychro-Calculator

No. 2982 (Dealer, Algiers)—"You mentioned in REFRIGERATION NEWS, page 10, Volume 19, No. 5, Serial No. 393, September 30, 1936, the introduction of a 'Psychro-Calculator,' by the Utilities Engineering Institute."

"Please let us know if, eventually, you should be able to supply one of these tables, and, if in the affirmative, at what charge."

Answer: We have referred your request to the Utilities Engineering Institute, 404 North Wells St., Chicago, Ill.

The Buyer's Guide

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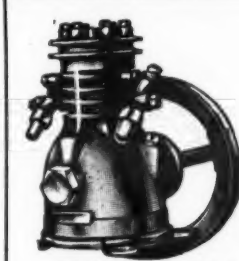
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